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THE
RAILWAY MAGAZINE,

AND

STEAM NAVIGATION JOURNAL:

CONTAINING

COPIOUS ACCOUNTS OF ALL RAILWAYS,

AT HOME AND ABROAD;

**WITH WYLD'S MAP OF THE GREAT WESTERN AND BRISTOL AND
EXETER RAILWAYS, NUMEROUS WOOD ENGRAVINGS, ETC.**

NOTICES OF INVENTIONS, AND SCIENTIFIC DISCOVERIES.

BY JOHN HERAPATH, ESQ.

VOL. VI. NEW SERIES.

LONDON:

Printed by A. Macintosh, 20, Great New Street.

**PUBLISHED BY JAMES WYLD, CHARING-CROSS EAST,
AND SOLD BY ALL OTHER BOOKSELLERS.**

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PREFACE.

Our readers will perceive, by a notice on the wrapper of our 42d Number, that we have at length yielded to the request of some highly respectable gentlemen connected with the railway and mercantile world, and determined on making our present work a weekly instead of a monthly journal. For the increased labour which this object will throw on us, we have associated with ourselves gentlemen of great and commanding abilities, and we doubt not to make our work still more deserving of public support.

We have been induced to do this also in consequence of the demand for earlier information, and in consequence of the impossibility of comprehending within our limits, notwithstanding the constant extra sheets we give, any reasonable account of the reports and business of the great and still increasing number of companies. It is not, however, without deep regret that we submit even to the trifling change contemplated. Our Magazine has been to us a friend that has brought us many new and highly-esteemed connexions, and more particularly among the directors, secretaries, and officers of the various companies. We may affirm there are but few lines in the three kingdoms out of which we have not gained one or more valued friends, for whom we have the greatest personal regard. Of the success of our journal, we shall mention but this one fact, namely, that it not unfrequently happens that the consumption of paper by our wrapper alone exceeds twice the quantity consumed by the whole Magazine prior to its coming into our hands. Gratifying as this has been to us, there are two other facts still more so, the pride and pleasure of mentioning which we hope, if egotistical, are pardonable. The first is, that in every case, we have taken such a conciliatory course as to make our opponents, and those on whose conduct or concerns we have felt it our duty to comment, our friends. The second is, that in no one instance, to our recollection, has this Magazine failed in any great cause it has taken up. We know that its circulation is amongst the highest in the land; we know, also, that recourse is ever had to it for sound and useful information. But that it should have been so uniformly successful, is much more than could have been expected, and more than can, perhaps, be said of any other journal of the age. We can only attribute it to an upright mind, brought to bear on the sound side of the subjects, with perfect honesty of purpose. Into our future labours we trust to carry the same qualities; and we hope for the same success. In the meantime, we beg to return our grateful sense of the obligations conferred on us by our numerous friends and supporters, and to hope that we shall hereafter be found rather more than less deserving of them.

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THE RAILWAY MAGAZINE;

AND

CIVIL ENGINEERS' REGISTER.

No. XXXVII.

MARCH, 1839.

NEW SERIES.

Irish Railways. By the EDITOR.

(Continued from Vol. V. p. 606.)

IN our last we advocated the policy of non-interference on the part of Government in the construction of railroads in Ireland, except in so far as to afford the necessary stimulus to private enterprise. We showed that Government could not enter on this subject as railway directors, without involving themselves in difficulties, to the magnitude and extent of which no limit could be assigned. The more we consider it the more we are convinced of its truth.

Many landed proprietors in Ireland affect to take an opposite view. It is natural they should. They have an interest in doing so. The real secret however lies in a small space, namely, an attempt to *elude the operations of the Poor-laws, and to shift from their own shoulders to the English public's the employment and maintenance of their poor.* This is the Alpha and the Omega of their object, however much it may be concealed under the shade of high-sounding notions of patriotism and of love for their country. Bring these flaming patriots to a proper touchstone, and their admiration of Government management—with the exception of a few who are looking for a share of the loaves and fishes—will be changed into the strongest disapprobation. Were Ministers to give but the slightest intimation of constructing the railways of Ireland at the expense of the country they are intended to benefit,—which is the only legitimate way of doing it, unless by private companies;—were they to put an impost, for the purpose, of only 1s. per acre per annum on the 14,600,000 cultivated acres,—new lights would immediately break in on the gentlemen who are now so eagerly advocating a Government system. Ireland will then either not want railroads at all, or it will be found by far the wiser course to leave them to private speculation. All the inter-

minable evils in the long list of public works in Ireland would then be paraded forth to scare "so unjustifiable a job." Though it were to benefit Ireland from the core to the skin, every hill and every dale would resound with the deepest denunciations of the tyranny of the measure and the uselessness of the project.

Let Government propose some such a plan as this, and we will risk our existence on the result.

To our surprise, Mr. O'Connell has lately, from an out-and-out opponent of the commissioners' system, become an equally out-and-out advocate. Every man certainly has a right to change his opinion, his judgment being convinced, and the honourable member is as much entitled to this privilege as any other man. But we should like to know from Mr. O'Connell, whether his sole object is not the same as we have stated above, namely, to employ and maintain the Irish poor at the expense of England for at least some years to come; in other words, to plunder the industrious of this country of countless millions to save his pockets and those of others a few pounds, knowing as he must know, that no Government system ever would be palatable to his countrymen.

If, however, Mr. O'Connell is become so enamoured of the Government plans, why does he not lend a helping hand to raise the money for them? No man knows better the road to the people's pockets than he does; and we should imagine—convinced as he is of the utility of railroads, and partial as his improved judgment has made him to the commissioners' system—he would find no difficulty in getting up a rent for the permanent advantage of his country. That he may not be at a loss we will furnish the Hon. Member with a hint how it may be done.

Ireland contains about 8,000,000 persons. Now, at only 1*d.* per week each, this would amount to above 1,733,000*l.* per annum. Three years of such a rent would make all the main lines in the kingdom. We do not suppose that every child can afford to pay a penny per week; but Mr. O'Connell knows how to apportion it so as to amount to the same thing. Probably this very simple and natural plan has not occurred to him, and no doubt he will therefore be thankful to us for it, and immediately adopt the suggestion.

While we are on questions, we should like to put one or two more to Mr. O'Connell. Is not the Government of this country considered by the mass of the Irish people an odious usurpation of "Foreign Englishers"? Is not every project

of the Government viewed by them with jealousy and dislike? Is not Government property regarded there as common prey, which it is a merit to plunder or destroy, and a sin to protect? Suppose, then, our Government made the railways in Ireland, would it not be regarded with hate, as another heretical rivet added to the fetters of Irish bondage, by a constraint over the freedom of their motions? Could, then, Mr. O'Connell tell us how long even the rails would lie on the blocks; how long such roads would be safe; or what multiple of the usual expenses of English railroads it would take to watch, repair, and protect them? Mr. O'Connell could answer these questions if he pleases; but it would be in a way to give a quietus to his interest and hopes, which, we trust, if ever the measure is brought before Parliament, the sense and honesty of our English legislators will do for him.

Commissioners' South-Western System.

Having taken this brief view of the impolicy of the Government interference as regards Ireland, and the evil consequences and expenses as regards England, we shall take a glance at the system itself of the roads as laid down by the commissioners. We will begin with the lines to the south-west.

Here we have for our guide the commissioners' maps, furnishing the relative amount of traffic and weekly number of passengers, with the directions which this traffic and the travellers take. Most excellent, if correct,—and we have not the slightest reason to suspect they are not—these maps certainly are. Indeed the whole labour of the commissioners, in the information they have collected, with the many sound and judicious observations they have made thereon, does them great credit; and we are sorry we cannot go to the extent of approving of their ulterior recommendations.

It appears by the traffic map, that the trade to the south-west goes together for about twenty-five miles out of Dublin. Here it separates into two grand streams, a large portion of it taking the course of the Grand Canal, and down the Shannon to Limerick; and the remaining part by Athy, Carlow, and New Ross, to Waterford. The passengers almost follow the same tracks. As far as Naas the road is common; but at this place the stream bifurcates, one part goes by Kildare, Maryborough, Roscrea, and Nenagh, to Limerick; the other by Carlow, Kilkenny, Clonmel, and Fermoy, to Cork.

The natural conclusion from this is, that if any railways at all are to be made, these are the courses they should follow; for it is a principle in laying down lines of railway, to divert the channels of traffic as little as possible, on account of the injury to existing interests, and the injury the lines themselves would sustain by the loss of the intermediate traffic. But the commissioners perceiving that the travellers which go right out between Dublin and Limerick do not exceed about 120 per week, and between Dublin and Cork, about 100 or 110, and probably thinking, therefore, that no single line to either place would at present pay, they have endeavoured to lay down a plan for the purpose of embracing the traffic of the two. Their line takes nearly an intermediate course between the two main streams, through bogs and an almost desolate country, passing by some small towns, but touching none for 125 miles to Limerick, except Thurles, which contains 7,000 persons, but has apparently very little intercourse with the capital or other towns. By this means, the line departs for 70 miles together from the two grand channels of travelling, and in some places, leaves either as much as 20 miles distant.

Here, it appears to us, lies the great error in the commissioners' plan. It has been shown on the Grand Junction line, that the intermediate travelling on a railway of about 100 miles long, passing by tolerable towns, is at least equal to that throughout the whole line. In a line of 125 miles, the travellers right through would probably be diminished at least 35 per cent., so that the intermediate travelling would, in this case, be more than double that throughout the whole distance. Now, by leaving the towns from which this intermediate travelling flows, nearly the whole, or all of it must be lost; and, consequently, two-thirds of the traffic which a line to Limerick might expect, if made in the present stream of it, would be sacrificed, besides an immense injury inflicted on the property in its course. Hence the combined plan of the commissioners would pay worse than a line to either Cork or Limerick alone, if constructed in the track time has beaten out.

On the broad basis, therefore, of pay and public utility, we feel bound to condemn this south-western plan of the commissioners. We have not the slightest hesitation in saying, that, if carried out, it will entail incalculable mischief on nearly all the best property of these parts, and, as a matter of speculation, will end in disappointment and loss, whether it be to the Government or private individuals.

Besides this general bad principle, there are several serious defects in the plan. For example, the large intercourse between Clonmel and Kilkenny, and also that of the important towns of Waterford and Wexford with Dublin, is left to shift for itself. The intercourse of either of these towns with Dublin, though making but little figure on the map, on account of being divided into different routes, is, however, very great. Waterford, for instance, contains near 29,000 inhabitants, and the number of passengers passing to and from it, and Thomastown, and near it, on the road to Kilkenny and Dublin, is 20 per cent. more than that between Waterford and Clonmel. For the latter, or less number, the commissioners have provided, but for the former, the greater, they have not. Again, Waterford is 85 miles from Dublin, and if its inhabitants wish to go by railway, they must, by the commissioners' system, travel some 55 miles to Thurles, and then they would be about as far from Dublin as when they set out.

We hope it will not be supposed we have been hunting up defects in the commissioners' system for the purpose of depreciating it. If we had, there would have been no difficulty in multiplying them many times. The fact is, our inclination leads us rather to support the commissioners, but our sense of public duty compels us to state the facts as we find them.

At present we have confined our observations to the system, without going into any of the details regarding particular places and distances, or of course into the gradients. From our limits, we are necessarily confined to take up small portions of the subject at one time, and we are more especially confined now, on account of the pressure of the reports. We have, however, before us, a small map, published some time since by the Great Leinster and Munster Company, which, in our opinion, presents a much more rational and useful system of railways than the commissioners', for the south-west of Ireland. For about 30 miles out of Dublin, a main trunk is formed, and from this point, one line goes off to Limerick by Maryborough, Roscrea, and Nenagh, the present line of travelling; the other goes by Athy, Carlow, Kilkenny, Clonmel, and so on to Cork, also the line of the present traffic. From Carlow a branch turns off to Wexford, and from Kilkenny another to Waterford. A communication is also formed between Limerick and Waterford, by a junction line from Cahir to Limerick. The town of Galway, containing above 33,000

inhabitants, and having great intercourse with Dublin, but somehow left out of the commissioners' plan, is provided for by a branch from the Limerick line near Roscrea.

This system, therefore, is much more efficient than the commissioners', and does no injury by diverting the traffic out of its present channels. It will therefore pay better, as we have shown before; and the only question is, as to the gradients and magnitude of the works. Upon this point we can say nothing, not having seen the sections, except for a small portion, the Kilkenny part. On the company's line the section of this part is remarkably good, and the works light; we believe the gradients nowhere exceed $10\frac{1}{4}$ feet per mile. The commissioners' line to Kilkenny, as first laid out, is also very good, and the works not heavy; but the gradients are inferior, being 16 feet a-mile; and the distance to Kilkenny is $5\frac{1}{2}$ miles longer than the company's.

By a subsequent act of the commissioners, these good gradients have been deteriorated for the purpose of reducing the cost, and there is now one of near $26\frac{1}{2}$ feet a-mile. The company's line, therefore, to Kilkenny, is far preferable to the commissioners' in gradients, besides being $5\frac{1}{2}$ miles shorter, not disturbing the course of the traffic, and affording accommodation to Wexford by a branch which, owing to the ground, the commissioners' Kilkenny line could not.

If the gradients on the other parts are equally favourable, there can be no doubt this is the proper system to be adopted. But even this system, if made at once, we are not sure the traffic of the country would profitably support. If made gradually, so as to allow the resources of the country time to develop themselves, there is no question of the whole turning out a profitable speculation. Some parts, we firmly believe, would now pay well. For instance, that to Kilkenny, and Clonmel, and Waterford on the Cork line, and on the Limerick, the portion as far as Maryborough exhibits a traffic and intercourse which leave no doubt in our mind of an ample revenue.

Atmospheric Resistance on Railways. By HENRY BOOTH, Esq., President of the Liverpool Polytechnic Society, and Treasurer, &c., to the Liverpool and Manchester Railway. From Y. Z.

TO THE EDITOR OF THE RAILWAY MAGAZINE.

SIR,—The following observations appear to me to possess some novelty, and may perhaps have in them sufficient in-

terest to merit a place in your Magazine. They are portions of a paper read at a recent meeting of the Liverpool Polytechnic Society, by the President, Henry Booth, Esq. After some remarks upon the nature and form of surfaces, offering the most resistance to the wind, reference was made to experiments on the Whiston inclined plane, recorded in Mr. Nicholas Wood's report to the directors of the Great Western Railway, and the paper, in substance, proceeded as follows :—

“ In the experiments lately made to ascertain the resistance of the air against a train of first-class railway carriages, there were four coaches, the foremost of the train presenting a square flat surface of six feet by five, or thirty square feet, in direct opposition to the atmosphere. But besides the resistance against the *front* of the *first* carriage, there would be the resistance along the sides and tops of the carriages, and underneath them ; also by the axles and by the peripheries and spokes of the wheels. The form of the *hindmost* end of the *last coach* (that of a square flat surface, of the same dimensions as the *front* end of the first coach) would also tend to increase considerably the resistance offered by the air to a train of carriages at a high velocity. This negative resistance, if I may so call it, occasioned by the flat end of the last carriage, is to be attributed to the disturbance of the equilibrium of the atmospheric *pressure*. If the carriages are moved through the air at a very high velocity, a partial vacuum is created in the rear of the last coach, before the atmosphere has time to close in behind ; and this partial vacuum in the rear will increase the resistance in the front.

“ The same principle operates more obviously in the case of a vessel moving through *water*. In ship-building, it is quite as necessary to preserve the hydrostatic pressure *behind*, as to form the fore part of the vessel so as to cut through the water with the least possible resistance. Thus it is, that a fine clear rake behind is one of the most essential points in naval architecture. With such a form, the water, by an easy and almost imperceptible motion, closes in behind, as the vessel moves along, and the hydrostatic pressure is preserved alike on all parts of the vessel ; the only force required being to divide or cut through the water in front. But if we suppose that instead of this fine rake behind, a vessel have a square blunt end, let her bows be ever so sharp, no power that we could apply, would move such a mass beyond two or three miles an hour, because of what is vulgarly called the *suction* of the water behind,

but which is nothing but the disturbance of the equilibrium of the hydrostatic pressure: a partial vacuum being created behind, and, in consequence, an enormous comparative resistance being opposed in front. Now, the same law is in operation when a body passes rapidly through the *air*, as when it is propelled through the water. The medium is denser in the one case than in the other; but it is a question of comparison and degree, not of absolute fact. In addition, therefore, to the resistance which a train of carriages meets with in front, when forced through the air at a high velocity, and which is similar to the force of the wind when opposed to surfaces at similar velocities, there is the resistance occasioned by the square flat form of the carriages behind, disturbing the equilibrium of the pneumatic pressure—a resistance which I believe has not yet been noticed by writers on this subject.

“In the experiments down Whiston inclined plane, Mr. Nicholas Wood found that at $32\frac{1}{2}$ miles per hour, the total resistance was 421 pounds; and that of this total resistance, 93 pounds were due to friction, properly so called, and 328 to the atmosphere; 22 per cent. of the whole being due to friction, and 78 per cent. to atmospheric resistance.

“Now, if we examine the *amount* of resistance as above recorded, we shall find it far more than the *frontage* of a train of carriages would sustain. At 32 miles an hour the resistance of the air, according to recorded experiments, is about 5 pounds per square foot; and the front of a railway carriage, such as was used down Whiston inclined plane, presents an area of 30 square feet, or a resistance of 150 pounds; while Mr. Wood states the actual resistance to be 329 pounds. Something certainly is due to the wheels and axles, and to the upper and lower surfaces and sides of the carriages passing through the air, and to the enlarged area of 30 square feet, as compared with experimental surfaces of perhaps a single foot; but still I apprehend not nearly enough to account for the difference between 150 and 329 pounds. But if we admit the resistance caused by the square flat surface of the back of the carriage, as explained above, in addition to the frontage, there will no longer be any apparent discrepancy in the result. I am aware that to the popular mind it will appear paradoxical, to attribute any serious atmospheric resistance to the back part of a moving train; nevertheless, we cannot doubt that it exists. In reference to a body moving through water, the form of the back end is admitted to be of essential importance; and

comparatively to the relative densities of air and water, there appears to be no reason why it should not be equally important, in respect of a body moving at a very high velocity through the rarer medium. A more mature consideration of the subject, and further experiments, however, will be necessary to decide the comparative value of this element in the general question.

“In our deliberate speculations also, upon the enormous resistance occasioned by the atmosphere, in the experiment above recorded, we must be especially careful not to generalize too broadly, nor to assume as a law, that at a speed of $32\frac{1}{2}$ miles per hour, the resistance of the air is four times that of the load. It bore nearly that ratio in the particular experiment recorded; but if the engine and tender had been attached to the four coaches, the weight of the train would have been doubled, while the atmospheric resistance would probably have continued very nearly the same, consequently, the ratio of comparative resistance would have been lessened one-half. It will follow, also, that if there were eight coaches instead of four, there still being only one front and one back (the two chief sources of atmospheric obstruction), the ratio of comparative resistance would be still further diminished.

“Another consideration must not be overlooked in our estimate of general results. By the particular experiment recorded, it appears that as much mechanical force is required to propel 22 tons weight $32\frac{1}{2}$ miles per hour, against the resistance of the atmosphere, as to move 100 tons at the same velocity, supposing no such atmospheric obstruction to exist. But on the other hand, looking even to this extreme case, there is this valuable property in a load consisting largely of atmospheric resistance, namely, that it accommodates itself to circumstances, and adjusts itself to the emergency. If, in your journey with a light load at a high speed, you come to an inclination of the way, requiring one-fourth more power to ascend it, diminish your speed five or six miles per hour, and you surmount the difficulty; while, if you had an absolute *weight* of 100 tons behind you, on coming to such an inclination, your progress would be stopped altogether. If the resistance of the air increases as the square of the velocity, so, on reducing your speed it *diminishes* in the same ratio; and this property has its peculiar value in railway travelling. The ordinary rule being a light load and a quick speed, by slightly reducing your speed you materially increase your power; and by this com-

pensating process are enabled to overcome the resistance offered by the varying inclinations of the road, and by the varying number of carriages which constitute your trains."

The paper then proceeded to animadvert on the defective construction of chimneys, which in the late hurricane had occasioned so many fatal accidents in Liverpool; but this branch of the subject would not be particularly appropriate to a Railway Magazine. I am, Mr. Editor, yours, &c.

Y. Z.

West Cumberland, Furness, and Morecambe Bay Railway.

By INVESTIGATOR.

TO THE EDITOR OF THE RAILWAY MAGAZINE.

SIR,—As you say, in your last number, that you have not received Mr. Hague's report of the embankment of Morecambe Bay and Duddon, I have directed it to be sent to you, bound up with Mr. Rastrick's report on the whole line of railway; and I trust, in return, you will do me the favour of inserting a few observations in reply to the letter of a correspondent who signs himself "Common Sense." He says, "Is not the bed of these bays deep, and therefore barren sand?" I am at a loss to know whether he means that the sand is deep, or the water above it, but, at all events, he seems to draw the conclusion that the sand is barren. Now, I will just state a few facts in contradiction of that. Last autumn a quantity of sand was taken from the lowest part of Morecambe Bay, and placed in a garden in the neighbourhood, but so as to be *entirely* separated from the soil; the sand, as well as the plot in which it was, were sown with grass seeds, and both are now covered with a healthy vegetation. In 1815, eleven acres of bare sand, from which the top had been removed to some depth in forming an embankment, were planted with willows. In 1828, the crop sold for 120%. It is stated by an intelligent correspondent of the "Whitehaven Herald," a paper which has advocated this undertaking in a talented and spirited manner,* that the best crop of wheat grown the last year at Cartmel, was produced at East Plains, on land enclosed from the Bay thirty years ago. The principal part of the endowment of Ulverstone school consists of land reclaimed

* Without intending to pass judgment on this scheme, we are sorry to see no better reference for merit than a pultry obscure country paper, equally distinguished for its ignorance and impudence. Who that has money to lay out would risk it on such authority?—ED.

from the sea, and supplies the town, in a great measure, with milk and butter. In 1801, three hundred acres recovered from the sea let for 750*l*. And the solution of all this lies in the fact that, according to the analysis of Mr. Binns, a talented surveyor of the neighbourhood, the Morecambe Bay sand contains 20 per cent. of calcareous matter, whilst the marl about Lancaster contains not more than 30 per cent.

Then, Sir, your Birmingham correspondent says that 200,000 tons, or cubic yards, are as much as can be excavated in a year; and that, therefore, it will require 10½ years to supply 4,304,000 tons, the quantity to be supplied by art to the embankment of Morecambe Bay. I have not your second volume by me, to an article of which he refers; but *your* "Common Sense" will pardon me if *my* common sense tells me that he has confounded *excavating* with *embanking*. I am not aware of any limit to *excavating*; with materials and men, I presume any quantity may be done. For instance, in 1379, Francesco de Carrara is said to have diverted the Brenta in a night, by a branch half a mile long, thirty yards wide, and probably three deep, as a passage for his galleys; which would just be, in round numbers, about 80,000 cubic yards in twelve hours. But it is certainly stated that not more than 200,000 yards or tons can be *embanked* in a year; the space of a railway embankment not admitting of more than two wagons discharging at a time. But here shines forth the beauty of Mr. Hague's plan. His wagons, fifty, or a hundred, or more, being fitted with bottoms to open, and drawn on to the piled way, on which rails are laid, will discharge their loads *simultaneously*; the embankment being thus raised up gradually across the whole Bay. This will be done from each end. If, therefore, two wagons on ordinary embankments discharge 200,000 tons, or 300,000 yards in the course of a year, on Mr. Hague's piled way fifty wagons, that is, twenty-five at each end, might discharge 5,000,000, considerably more than the quantity required in that time, if, as your correspondent quaintly observes, "Old Cocker be right." As there will be the convenience of water conveyance, large quantities of materials will be brought to the embankment by launches and flat-bottomed boats in favourable weather; much will be added by dredging, and, of course, an immense proportion by the action of the sea, in spite of your correspondent's merriment at Mr. Hague's calculations on that point. I do not comprehend, Sir, how your correspondent at Birmingham

can fix the price of materials to be got for the embankment in Furness, when he says they will cost 1s. 6d. per ton. In regard to that, I prefer an authority on the spot. A talented and experienced individual, who writes from Cork, under the signature of "J. S.," says, that in 1821 he saw the breaches of an embankment filled in with 9,000 cubic yards of material at 5½d. per yard. Now, call that 10d. for tons, and the 4,304,000 will cost about 179,330l.; or even at 1s. per ton, 215,000l. instead of 323,000l. It will not be necessary to obtain all the material by excavating, as your correspondent supposes; immense quantities of rock, rubble, and shingle lie loose on the shore. And what is obtained from the railway cuttings must be considered free of the cost of excavation, and perhaps of leading too, as it must be taken out at any rate, and may very possibly be disposed of more cheaply by being taken to the embankment, than by being laid in a spoil-bank. With respect to your correspondent's vague assertion as to the cost of piling, in the absence of any details, it is worth nothing against the opinion of such a man as Mr. Hague, deliberately formed by investigation on the spot. In fact, Sir, it seems to me to be of little moment whether the cost of passing the estuaries be twice the amount calculated by Mr. Hague or not. The Grand Junction line, and its continuations, must have an outlet from Lancashire into Scotland; and it is only by the coast of West Cumberland that the levels will admit of this being properly effected. Considering the speed looked for, and which will be attained on good lines of railway, the cost, within reasonable limits, is of no moment compared with the advantage of forming a straight and level line. That the cost, however, in this case will be in a great measure, if not entirely, met by the land which the railway itself reclaims, I think you will admit that I have demonstrated, even in contradiction to the reasoning of "Common Sense."

I am, Sir, your obedient servant,

Jan. 21, 1839.

INVESTIGATOR.

Suggestions on Arches. By Mr. J. THOS. HACKER.

TO THE EDITOR OF THE RAILWAY MAGAZINE.

SIR,—The frequency of using the semi-elliptic curve for arches in bridges and viaducts, has induced me to trouble you with a few remarks on the subject. It will generally be observed that elliptic arches often exhibit a settlement

in that part of the spandril which is over what mathematicians call the parameter. This is chiefly caused by the thrust at these points being diverted as it were from following the line of its curve, and thus its force is directed to a point above the springing of the arch, where there is seldom a sufficient resistance to prevent its spreading, and, of course, the central part of the arch, from its flatness, sinking proportionally. Utility, strength, and beauty are the essential principles of architecture, and of course of engineering; the two former should never be sacrificed for the latter, in railroad works particularly. The vibrations produced by the transit of heavy engines and trains on the works, together with the various concussions caused thereby from inequalities in the road or rails, indicate that considerable advantages would result from laying the permanent way as far above the crowns of the arches as economy and circumstances will permit. Wherever it could, I should say the ballasting should not be less than one-seventh of the span above the crown, which would materially decrease these mischievous effects on the arches, and considerably increase their stability. Arches should be formed of curves the least liable to fracture or injury, and the most capable of sustaining loading on one part, without danger of disfiguring or injuring the other parts. This object will be best attained by adopting segments as near the quarter circle as possible. The thickness or depth of the ring should not, in my opinion, to insure strength and stability, be much less than the twentieth of the span. Bricks on edge are the principal materials now employed in turning these arches, which seem to answer very well for those of small span. But for brick arches of great span, another method is necessary, in order to bond the arch in thickness as well as in the width. To prevent the separations likely to occur between the ring-courses as at present used, I would recommend that bricks for turning arches should be made on purpose, according to the dimensions of the arch, some tapering lengthways and some breadthways, in their thickness. This expense would be much less than might be expected, and would be much more than compensated in the strength and facility of making the arch.

Oblique arches could be nearly as easily turned as those on the rectangular plan; by making a few moulds also for the bricks used in them. A plan of this kind would not only expedite this part of the work, and vastly improve its appearance, but, by the easier method of bonding it together, would render it almost a solid mass.

From my observations on arches, I have ever observed that arches of segments, and especially quadrants, of arches, have stood much better and freer from fractures and settlements, than those of any other figure whatever, and are less liable to be injured by settlements when they occur, than ellipses or ovals. This I attribute to the thrust being more uniform, on account of a perfect symmetry of figure throughout the curve. Hence, therefore, I should always use them wherever I could.

I am, Sir, your obedient servant,
J. THOS. HACKET.

On the Rapid Discharge of Earth-wagons.

By Mr. WM. VERE, C. E.

[Mr. Vere having observed the bungling and expensive contrivance of emptying the wagons on the Eastern Counties Railway, which we have also noticed before, applied to the office to suggest an improvement. By Robertson, the secretary, he was requested to send in a description of his plan, under, if we recollect the correspondence right, the promise to be employed and remunerated if his plans were approved. It seems his plans were approved, for his employer was told upwards of a-year ago he must hold himself in readiness to go on the line, and he attended, by appointment, at the office several times and days in succession, for the purpose of being introduced to the great man, John Braithwaite, Esq., &c., &c., the engineer to the company. Owing, perhaps, to his vast engagements, Mr. Vere was never honoured with the light of the "acting engineer's" countenance. But what is worse, it seems to have slipped Robertson's recollection that Mr. Vere's time is his stock in trade; and hence this gentleman has not only not been employed, but has not even been paid for the time he has lost in dancing attendance, by official request, at the company's offices. Conceiving that his plan will be found simple and serviceable, Mr. Vere has sent us his letter to the Eastern Counties secretary, briefly describing it, which we present to our readers.—ED. R. M.]

"Sir,—I have been out, and did not receive your favour of the 30th ult. till last evening, or I would have replied to it more promptly. I beg to submit the following for the consideration of the directors.

"Instead of a *platform*, I propose using a pair of well-stayed *shears*, with proper blocks, hoisting and guide-ropes,

crab, &c., by which a train of loaded wagons shall be discharged one at a time, and put back in the return rails very speedily.

"If this suggestion should be deemed worthy of consideration, perhaps closer investigation of the height and width of the embankment to be formed might show that a single spar (or derrick) on each side of the embankment, and acting separately, might be preferable, instead of two spars united as shears.

"Each wagon would require two iron eyes, one standing just above the fore-board, and the other above the back-board, in the middle, permanently fixed.

"The operation would be this—when the train of wagons is pushed up against the preventive chain (fastened at a proper height from leg to leg of the shears), it must either stop, or break that chain, or break the fore-stays of the shears, neither of which two last are very probable. On arrival, the hooks of the hoisting slings, and of the cap-sizing-rope, and guide-rope, are hooked into the eyes of the first wagon, when a purchase being made upon it by the crab, the wagon turning bottom upwards discharges its load, and then by the gravity of its wheels, axles, &c., would right itself again; the guide-rope being hauled upon, the empty wagon would be drawn upon the *return rails*, and the next wagon come under similar operation.

"This may seem a tedious process, perhaps more so from my way of describing it, but let any one consider the rapid discharge of a collier, by a derrick, into a barge alongside, and I think it would go far to recommend the adoption of an almost similar plan for the earthwork of a railway.

"The application of shears and tackle first occurred to me, some months ago, when looking at the cuttings on your railway, and observing the great labour of wheeling the soil up to the surface to form the gullet, for it is clear enough that a wagon, either loaded or unloaded, when slung (by all four corners), could be moved in any direction, and hoisted or lowered at pleasure by a crab.

"If I had a contract for earthwork, I would adopt this plan, in preference to any other I know of.

"I have not entered into some detail, which perhaps would be better given in person, which I should be most happy to do, should I be permitted the honour, or I would make drawings if required.

"In conclusion, I can only say, that my expectations of

remuneration would not be extravagant; as some attentive and competent person must be always present, I would willingly attend its operation, on moderate pay, and serve the interests of the company to the best of my ability: but if a platform is preferred, I have an idea that some improvements might be made in constructing one; but in my opinion never to compete with the plan which I now have the honour of submitting.

"I am, Sir, most respectfully, your obedient servant,
"WM. VERE."

"14, George-street, Commercial-road, Ratcliff,
"Dec. 4, 1838.

"To J. C. Robertson, Esq.,
"Secretary to the Eastern Counties Railway Company."

London and Birmingham Railway, Situation and Prospects.
By A FRIEND TO RAILWAYS AND TRUTH.

TO THE EDITOR OF THE RAILWAY MAGAZINE.

SIR,—I trust to your principles, of giving the public true information, to insert the following observations on the London and Birmingham Railway in your popular and useful miscellany. The unusual situation of the financial matters of this concern has been more than once commented on in the public papers. By the report it appears that 2,249,225*l.* has been called in of the original capital of 2,500,000*l.*; and 124,525*l.* on 625,000*l.*, the quarter shares. In all, there has been called up 2,373,750*l.*, out of 3,125,000*l.*; leaving 751,250*l.* in arrear on the calls. The company have borrowed on debentures, 2,125,000*l.*; notes, 365,500*l.*; and on account, 75,967*l.* 12*s.*; making a total of 2,566,467*l.* 12*s.* Now the writer of the city article in the "Times" of the 14th ult. imagines that the sum so borrowed is in anticipation of the 751,250*l.* arrears of calls, and asks on what security the difference between this and the large sum of 2,566,467*l.* borrowed rests? I believe this is very easily answered. The company, by their several Acts of Incorporation, have the power of raising a capital in shares and on loan, of 4,500,000*l.*; and for all sums taken up on debentures, the whole works are mortgaged. Consequently the security for the debentures is the whole property of the concern, and the interest must be paid in preference to any dividend on the shares. The observations in the "Times" do not, therefore, appear to me to have any

weight, nor to set the situation of this company in its true position.

By their Acts of Parliament, as I have stated, this company have a capital of 4,500,000*l.*, which they have already exceeded, by calls and loans, to the extent of 500,000*l.* They now, therefore, propose to go to Parliament again, to raise another 1,000,000*l.*, making the total capital 5,500,000*l.* If they should also take up the remaining 500,000*l.*, by loans, the company will be in the peculiar situation of having a paid-up capital of 2,373,750*l.*, and a debt of 3,126,250*l.*

Herein, however, consists the art of the management. The loans are only entitled to an interest of 5 per cent. per annum. Any little surplus, therefore, above 5 per cent., is accumulated and displayed in pretended large dividends on the shares. If the 5,000,000*l.* already raised, had been by shares, the recent dividend would have been under 3*l.* per share.

But in the dividend, as it now stands, the public are not aware of all its merits. They suppose the 3*l.* 10*s.* per share is a legitimate dividend for half a year. It is not so. The receipts from which it is drawn are those from the first opening of the railway (for a period of near 18 months, namely, from July 20, 1837 to Dec. 31, 1838), while the interest of the 2,500,000*l.* borrowed is only charged for little better than a quarter of a year; that is, from the 17th Sept. last. Before this period it was paid out of the principal. The debenture for maintenance of way is also for only 31½ miles to Tring, from the same period, namely, Sept. 17th, a quarter of a year; the rest of the 112½ miles being in the hands of the contractors. Had, therefore, the interest been taken for the full 18 months, and only proportionally to the distance opened, and had the expenses of the whole way been similarly taken and deducted, the probability is that this fine concern would, up to the present time, hardly pay the expenses, and no dividend made, whatever it may do hereafter.

Well as I wish to this great work, and sorry as I should be to see any mishap to it, I must confess I am afraid the outlay has been far too great to have any chance of a good return. It is now admitted it will cost 5,500,000*l.*; but people who are good judges say it will never be completed for 6,000,000*l.* What trade can ever pay this, the bare interest of which is near 1,000*l.* per diem, and exceeds by

many thousands per annum the company's latest revised estimates of the whole revenue of the line?

A little jockeying in loans may for a while produce a favourable appearance, but a time will come when the debts must be paid off, and the truth be exposed. To pay only the ordinary interest of 5 per cent. on the whole capital of 5,500,000*l.* will require an income of at least 687,500*l.* per annum, or about 2,000*l.* a-day, for every day in the week. To pay 10 per cent., the revenue must be very nearly doubled.

That your readers, Sir, may not suppose I am grounding my fears on a bed of sand, I will take the company's own figures. In 1837, they published a revised estimate of traffic, equal to 581,107*l.* per annum. Their expenses are, I have from very good authority, nearly 75 per cent. of the receipts; but suppose them only 60, beneath which it is not likely they ever will be, and there will be left 232,442*l.* profit to be divided on 5,500,000*l.*, or not quite $4\frac{1}{2}$ per cent. per annum.

This is the most favourable view that can be taken of the prospects of this company. If we were to analyze the items in their balance sheet, we should show a much worse picture. It is not only their capital which has been so excessive, but their expenses are enormous, and out of all proportion with other companies. For example, the maintenance of their way, which the Grand Junction have contracted for, at 250*l.* per annum per mile, costs the Birmingham, on the only portion they have at present in their hands, at a rate of upwards of 800*l.* per annum per mile!

I assure you, Sir, no man is a better well-wisher to this great line than I am; but I cannot conceal that my fears are strong. I hope I shall be mistaken. I shall look forward to the next year or two with great anxiety. Whatever the fate of the line may be, I hope the directors will not descend to any sleight of hand to endeavour to mystify the facts. If the expenditure has been too great for any chance of a profitable return, it is better to let the shareholders know it at once, than to lead them on with false hopes and expectations which may hereafter fall back on them with threefold or tenfold violence.

I am, Sir, respectfully, your humble servant,

A FRIEND TO RAILWAYS AND TRUTH.

Extracts from a Manuscript Work, entitled "Theoretical and Practical Essay on Bitumen, setting forth its uses in remote ages and revival in modern times, and demonstrating its applicability to various purposes."*

THAT bitumen was used more than 4,000 years ago, at least for architectural purposes, is incontestably proved by the concurring testimony of many ancient authors. We find mention of it even in holy writ. The builders of the Tower of Babel "had brick for stone, and slime † had they for mortar." (Gen. xi. 3.) "Thou shalt pitch the ark within and without with pitch." (Ib. vi. 14.) "The mother of Moses took for him an ark of bulrushes, and daubed it over with slime and with pitch." (Ex. ii. 3.)

The employment of bitumen in the building of the walls of the ancient capital of the east, Babylon, and for sundry other purposes, is not unfrequently mentioned in profane history.

The same circumstance is also alluded to by Vitruvius, the architect, whose work is the only one on architecture that has survived the wreck of ancient literature. To enlarge upon its merits, as they are universally acknowledged, would be superfluous. This writer's testimony, in favour of the use of bitumen for architectural purposes, is, therefore, unexceptionable, inasmuch as he speaks of matters relating to his own profession, and exhibits throughout his work the most profound practical skill:—

"I do not think it necessary to state with what materials the walls should be built, because those which are most desirable, cannot, from the situation of a place, be always procured. We must, therefore, use such as are found on the spot, square stones, flint, rubble-stone, burnt or unburnt bricks! for every place is not provided as the neighbourhood of Babylon, with such a substitute for lime and sand, as burnt bricks and liquid bitumen." (B. viii. c. 3.)

This last passage, which states a plain matter of fact, affords a more convincing proof than any other that can be adduced from ancient writers, of the utility of bitumen for

* This is one of the best practical treatises we have ever seen on this important subject, and we shall hail with pleasure its appearance before the public, not more on account of its intrinsic merit than the useful information it contains.—ED.

† The Hebrew word, which, in our English version of the Bible, is expressed by *slime*, and *pitch*, has been more appropriately rendered in the Latin, and other translations, by *bitumen*.

architectural purposes. The Romans were, at the time when Vitruvius flourished, at the zenith of their power ; the services of the most skilful architects and artificers were in constant requisition to adorn the proud and imperious mistress of the world ; the power and wealth of her inhabitants enabled them to procure from all the then known parts of the globe the most useful and costly materials ; Augustus himself (to whom Vitruvius dedicated his work) was foremost in his plans of embellishing the "eternal city," insomuch that it was his boast that, having found it of brick, he left it of marble. Yet Vitruvius, who was equally remarkable for his theoretical and practical knowledge, states it as the result of general experience, and, as a fact, admitted by his contemporaries, that bitumen is preferable to any other kind of cement, and regrets its scarcity.

We believe it to be an uncontroverted fact, that the cement of the Romans was far superior to that at present in use. Theirs (even that which Vitruvius considered inferior to bitumen) equalled marble itself in hardness, whereas ours is of a friable and crumbling nature. And though Mr. Nicholson, in his valuable "Dictionary of Architecture," combats the notion entertained, as he says, by many persons that the ancients possessed a process in the fabrication of mortar which is now lost, and pretends (whether right or wrong, we do not presume to determine) to inform his readers of the ingredients to be used in its composition, still he admits, we quote his own words *verbatim*, that the best proportion of lime and sand in the composition of mortar is *yet a desideratum*. He adds, that the goodness of that cement depends on manipulation. This assertion, if it be intended to prove anything, is futile. By proving too much, it proves nothing. The most careless workmen must, sometime or other, have stumbled upon the right way of fabricating mortar, had they been supplied with the proper materials, or in just proportions. He states, also, that when asphaltum is mixed with some other materials, they make a cement incorruptible by air and impenetrable by water. It may be inferred that the use of bitumen in architecture had not come within his own experience, or that he would have enlarged upon its inestimable properties, and not confined himself to a passing observation borrowed from other works.

Mineral tar appears to be petroleum farther inspissated. It is more viscid and of a shiny black colour. It liquefies with a very slight degree of warmth. This is the variety of

bitumen known by its designation of *slime* in Scripture. On account of its abundance in the East, it came, in ancient times, into general use as a cementing material. It is supposed by many to have vitrified on ancient buildings through exposure to the air. The discovery of its properties as a cement cannot be claimed by the moderns, although those who have re-exhibited it certainly deserve great credit. This tar has been within the last few years very extensively employed for various purposes in Europe, and forms the staple of the Bastenne and Gaujac Company,* who have imported large quantities of it into this country from the mines, situate near the Pyrenees, and made it subservient to many purposes, particularly that of paving footpaths and carriage roads.

Mineral tar, the first variety of the second species of bitumen, deserves particular notice on account of the many uses to which it has been found applicable. This variety, which has received its appellation from its similarity in appearance to vegetable tar, is that which was employed in cementing the tower of Babel, and is called in our English translation of the Bible, *slime*, the corresponding word to which in the Latin translations is *bitumen*. This and other bituminous substances fell, with perhaps occasional exceptions, into disuse for nearly 2000 years, whether from their scarcity in the more civilized regions, or the temporary relapse of mankind into barbarism, and their consequent inability to make new discoveries or avail themselves of those previously known. No doubt, bituminous substances have been used for ages in certain localities where they were plentiful, and where the inhabitants availed themselves of whatever materials were within their reach. We sometimes find incidental mention of bitumen in works of not very recent date, from which we gather such information as that mineral tar was partially used in cementing the stones of the Old London Bridge, and that the Arabs employed it in caulking their vessels. M. d'Eirinis, a native of Rus-sienne, in Greece, Doctor and Professor of Medicine, seems to have been the first who, having observed how very durable

* N.B. The directors of the above-mentioned company have entered into a contract with the proprietors of the mines of Bastenne and Gaujac, which secures to the company the exclusive right of selling and using the mineral tar of those mines in this country, and on all the Continent, excepting the kingdom of France.

and dry the houses were in the district of Neufchatel, in Switzerland, where bitumen was used, and having tested its properties by numerous experiments, brought it into public notice by the publication of several works.

M. de la Sèblonniera, who was a contemporary of d'Eirinis, succeeded in applying bitumen to various purposes. He presented to the King of France in 1740, a splendid vase, the marble and bronze about which were cemented with a bitumen mastic; this same mastic was used for repairing the basins at Versailles, the triumphal arch, and the superb vase of white marble on which the sacrifice of Iphigenia is sculptured in the north parterre. In the same year, two ships, the Mars, and Renommée, belonging to the French East India Company, were caulked with this substance, before sailing from L'Orient, the one for Pondichéry, the other for Bengal. On their return they were found to be much less worm-eaten than the other ships.

The main reason for which Bitumen was not employed more generally, appears to have been the difficulty of obtaining and extracting it in sufficient quantities. It was found to exist in several parts of France and Switzerland, but in quantities so minute, and in combinations so intricate, as to render the work of extraction too tedious and expensive for general purposes. The chief places where it was found, were Lobsann and Pechelbrunn, near Weissenbourg, in the Department of the Lower Rhine; Neufchatel, in Switzerland, and the Park of Pirimont, near Seyssel, in the Department of Aix. In none of these places, however, was the mineral tar found sufficiently pure or in sufficiently large quantities, to encourage its general application. It was not until after the discovery of the mines at Bastenne and Gaujac in the Department des Landes, near Bayonne, that any operations on a large scale were undertaken with it. The soil of these mines, which are situate at the foot of the Pyrenees, consists of loose sand, through which the mineral tar exudes in almost a pure state and in vast quantities. It possesses, far beyond all other bitumens, the property of combining with, and closely cementing, calcareous and other substances. Its most valuable characteristics are its adhesiveness and elasticity. Being combined with calcareous matter, it forms a substance preferable for many purposes to stone or wood. When subjected to great pressure it yields slightly, but does not crack. Its elasticity

and imperviousness to moisture render it infinitely more durable than metal or stone.

The precise date of the discovery of the mines of Bastenne and Gaujac is not known; but for upwards of thirty years the tar has been used at Bourdeaux and its vicinity, in combination with sand and calcareous matter, for roofing houses and making roads, footpaths, and floorings. It was at first employed, with sand only, in the repair of roads near Bayonne, and being found to answer this purpose, it came afterwards to be employed by architects and builders, in its combined form, in preference even to slate and stone, and at the present time upwards of 500 houses at Bourdeaux are roofed with it. It was soon discovered that it was equally calculated for flooring and paving, both in and out of doors. Its imperviousness to damp under all circumstances, its power of excluding vermin, and its comparative cheapness, were great recommendations in its favour as a flooring material; while its elasticity and uniformity of appearance, in addition to the other qualities enumerated above, rendered it in all respects preferable for street paving. It was tried with perfect success on the public wharfs and quays at Bayonne, where it still remains in its pristine state. Many bridges, roads, and footways, were also paved with it, in all of which it has been much admired and approved. The qualities of the mineral tar soon became more generally known, and the proprietors of the asphalte mines of Seyssel were among the earliest purchasers of it, for the purpose of admixture with the asphalte rock, and it has since been invariably employed in all the works undertaken by them. It is now several years since bitumen was first used in Paris, and its merits are now so fully acknowledged in France, that its use has been encouraged by the Government, not only in the metropolis, but also in the provincial towns.

In order to prove its advancing popularity, in spite of prejudice, and the opposition of parties interested in its failure, we need only state, that several contracts to an immense amount have been entered into by the French Government with bitumen companies; that bitumen has been used very extensively in the fortifications of Bayonne, the Government bonding warehouses at Bourdeaux, in the reservoirs constructed to contain the waters of the Seine at Batignolle, near Paris; for the pavement on the Pont Neuf; in passage Vivienne, the New Bazaar and elsewhere on the Boulevards; in the vaults and arches on the railroads from Paris to St. Germain and St. Cloud; in the building of an entire new district

in Paris, called New Athens; in the extensive promenade in La Place de la Concorde, where it forms a beautiful Mosaic pavement; in the piazzas in the Rue de Rivoli; in those parts of the Boulevards in front of Tortoni's and the arcades of the Opera; in the footway of the Mont de Piété; in the basin of a fountain constructing on La Place d'Ancien Opéra, Rue Richelieu; in the abattoirs or slaughter-houses; in the common sewers of the city, &c., &c.; and that it has been extensively applied to the fortifications of Vincennes, Douay, Grenoble, Besançon, Lyons, Lisle, Belfond, &c.; and to the covering of the roofs of the extensive commissariat magazines at Bercy, and of warehouses constructed several years since in the arsenal at Douay. It has also been most extensively used in Switzerland, particularly at Geneva. In Belgium likewise, several new buildings of the arsenal at Antwerp; the barracks at Liege, at Brussels, and at Tirlemont, have been roofed with bitumen. In all these instances, bitumen has been found to answer perfectly.

Many attempts have been made to manufacture a composition, similar to bituminous mastic, with coal and other vegetable tar; but in no single instance has any such compound been found capable of resisting the ordinary changes of temperature experienced in this country, or of continuing long uninjured by time and wear. The compounds manufactured with vegetable tar have invariably been found brittle and unelastic in a low temperature, and soft and yielding under the influence of a very slight degree of warmth. Besides, the smell in the process of laying down and repairing is disagreeable, and even offensive. On the other hand, the mastic prepared with mineral tar has no unpleasant odour when in a liquid state; and its tenacity is such as to resist the operation of cold and heat at a much higher degree than they are ever experienced in this country.

The tenacity and solidity of the Bastenne bitumen may be illustrated by two recent experiments of a very simple nature, but conclusive as to the result. A slab of the bitumen, one inch thick, was laid between two half-inch plates of cast iron, and subjected to hydraulic pressure, till the weight was equal to 160 tons. One of the plates broke, while the bitumen did not exhibit the slightest fracture or alteration. The second experiment consisted in cementing two of the bitumen paving blocks, such as have been laid by the company in Oxford-street, and applying heavy weights to the extremities. This experiment was tried on several occasions, and the invariable result was, that one of the

blocks broke in the centre, through the whole extent of the mastic and granite, while the jointing remained unimpaired. Specimens of the fragments are to be seen at the company's office in Moorgate-street, and at the wharf, Rotherhithe. These facts afford incontestable proof of the tenacity of the bitumen. Its durability has been tested in France and Switzerland, and found to exceed that of stone, the wear being more equable, and the external surface not being subject to deterioration from moisture. One of its main advantages, however, as a paving and flooring material, consists in its presenting a continuous surface, and having no interstices through which the rain can penetrate, as in the case of flag-stones and other foot pavement; it does not require relaying or moving, until it is actually worn away, when the remnant can be melted down and applied again. Another advantage is its elasticity, which makes it agreeable to walk upon.

The same results attend its use for roofing. In the roofing of all ordinary buildings, it may be applied as a substitute for lead, zinc, slate, and tiles. In public buildings it would be found economical, as well as greatly conducive to permanency, to lay a thin coating of the bitumen under the slate or other material of which the roof consists. In sheds, out-houses, and erections of a less durable character, a single layer of bitumen well jointed will prove more efficacious as a covering than any of the substances commonly employed, while it possesses the quality, when once laid, of enduring, without the necessity of repair, for an indefinite period. The saving effected in this mode of employing the bitumen is very great; for as it admits no damp or leakage, it renders the use of metal pipes in a great measure unnecessary, and it may be laid almost flat.

(To be continued.)

REPORTS.

LIVERPOOL AND MANCHESTER RAILWAY.—FOURTEENTH HALF-YEARLY MEETING.

REPORT.—The directors are happy to meet the proprietors with a statement of increased traffic in each branch of the concern, as compared with the corresponding period of last year. In the merchandise department, the revival of the foreign trade of the country, which was so much depressed in 1837, has contributed materially to this favourable result. Between Liverpool and Birmingham also, the goods traffic has increased; and a considerable augmentation of traffic along the line from Liverpool to the Bolton and Leigh Railway, has further added to the receipts in this branch of the company's business.

Since the meeting of proprietors in July last, the North Union Railway from Preston, through Wigan to Liverpool and Manchester, has been opened to the public. The conveyance of passengers by this line, commenced on the 31st October last. The arrangements for the transport of goods are not yet completed; and no correct estimate of the traffic in the coaching department can be formed from the brief experience of two months, in the most unfavourable season of the year.

In their last report, the directors informed the proprietors, that a junction line through Salford was in contemplation to connect the Liverpool and Manchester with the Manchester and Leeds Railway. The importance of this junction, as a work of great public accommodation, has become more evident from longer and closer consideration. The directors therefore have felt themselves warranted in taking preliminary steps for an application to Parliament for the intended Leeds junction, in the ensuing session. The assent of the proprietors will be necessary to carry into effect the proposed application; and a draft of the Parliamentary Bill will in due course be submitted for approval to a meeting to be specially called for that purpose.

*Statement of the Receipts and Disbursements for the Half-year ending
31st December, 1838.*

RECEIPTS.			
Coaching department	£79,277	3	2
Merchandise do.	54,215	7	0
Coal do.	3,201	0	6
	<hr/>		
	£136,693	10	8

EXPENSES.			
Bad debt Account	£392	1	8
Coach disbursement do.	11,051	4	5
Carrying do. do.	11,189	3	0
Coal do. do.	743	13	4
Cartage (Liverpool) do.	321	2	4
Do. (Manchester) do.	3,622	1	6
Charge for direction do.	384	6	0
Compensation (coaching) do.	81	16	7
Do. (carrying) do.	506	9	11
Coach-office establishment do.	746	8	2
Engineering department do.	175	0	0
Interest and rent do.	7,008	14	5
Locomotive power do.	26,427	10	11
Law disbursement do.	200	0	0
Maintenance of way do.	4,481	16	9
North tunnel disbursement do.	854	13	5
Office establishment do.	1,505	15	1
Police do.	1,133	14	8
Petty disbursement do.	45	0	0
Repairs to walls and fences do.	1,182	0	6
Stationary engine disbursement do.	668	4	10
Tunnel disbursement do.	468	5	1
Tax and rate do.	3,340	6	8
Wagon disbursement do.	4,449	9	3
	<hr/>		
	80,978	18	6

Net profit for half-year ending 31st December, 1838 £55,714 12 2

Statement of Receipts and Expenditure on Capital Account, from the Commencement of the Undertaking to 31st December, 1838.

The Treasurer, <i>Dr.</i>		£.	s.	d.
To amount of joint capital in shares and loans		1,381,040	18	0
Do. of dividends not paid		802	3	8
Do. of reserved fund and interest		4,486	17	2
Do. surplus in hand after payment of the sixteenth dividend		1,853	8	6
Do. net profit for the half-year ending the 31st of December, 1838		55,714	12	2
		<u>£1,443,897</u>	<u>19</u>	<u>6</u>

The Treasurer, *Cr.*

By amount of expenditure on construction of the way and works		1,376,073	16	11
Do. of arrears on calls		837	2	6
Do. in the hands of Messrs. Moss and Co., bankers, viz.,				
Reserved fund and interest	£4,486	17	2	
Balance	42,649	12	9	
		<u>47,136</u>	<u>9</u>	<u>11</u>
Do. balance of book debts due to the company		19,850	10	2
		<u>£1,443,897</u>	<u>19</u>	<u>6</u>

By the foregoing statement it appears that the net profits for the half-year amount to	£55,714	12	2
To which must be added	1,853	8	6

Being the balance, after providing for the last half-year's dividend, and making a disposable net proceed of	57,568	0	8
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The number of shares and amount of instalments, entitled to a dividend, are as follow :—

The old shares, as heretofore	7,968 $\frac{1}{80}$	£100 shares.
New shares sold according to the Act	136 $\frac{3}{80}$	£100 shares.
Four instalments, amounting to 30 <i>l.</i> on 7,968 50 <i>l.</i> shares	2,390 $\frac{1}{10}$	£100 shares.

Making a total of . . . 10,495 $\frac{45}{100}$ £100 shares.

On this number of shares the directors recommend a dividend of 5*l.* per share, amounting to 52,478*l.* 5*s.*, and leaving a balance of 5,089*l.* 15*s.* 8*d.*, to be carried to the credit of the next half-year's account.

CHARLES LAWRENCE, *Chairman.*

Liverpool, January 23, 1839.

GREAT WESTERN RAILWAY.

Seventh Half-yearly General Meeting, held at the company's offices, Princes-street, London, 12th February, 1839; W. U. SIMS, Esq., in the chair.

REPORT.—The directors have the satisfaction of reporting, that during the period from 4th June to 31st December last, 264,644 passengers have travelled upon the railway, being an average number of 1,278 per diem. Upon a calculation of the total number of miles travelled by all the passen-

gers, it is found equal to a daily average of 1,037 persons going the whole distance of line yet opened between London and Maidenhead.

The short trains did not commence running until the 17th of December, so that there had been scarcely any accession of income from that branch of traffic during the last half-year. The directors have every reason to hope that it will become an important addition to the company's receipts, and a great public convenience to the persons residing within a few miles of London.

They have considered it their duty, more with a view to future than immediate profit, to give the utmost attraction for the passenger traffic of every description to this line, by means of very frequent trains to every station. This is of course attended with a much increased expense at present, while so short a portion of the line has been opened, in consequence of the number of locomotive engines required, in proportion to the distance run, which are obliged to have their steam kept up during many hours of the day, and necessarily with a large consumption of coke.

	£.	s.	d.
The income from passengers, parcels, &c., to 31st December was	43,845	3	2
The charge on the traffic during the same period	25,548	16	6
Leaving a net profit of	18,296	6	8

This expenditure comprises the maintenance of way, as well as every other charge in respect of the traffic. The high cost of coke in London, where at present the only supply can be obtained for this portion of the line, and the quantity unavoidably consumed in consequence of the frequency of trains during the day, have rendered *that* the heaviest item in the charge.

The mileage duty, which is the most undoubted criterion of the comparative extent of travelling, places this company next to the Liverpool and Manchester Railway, in the scale of passenger traffic, exclusive of the business derived from the short trains which were not then running.

It may be proper also to observe that the mails, and many of the long coaches to Cheltenham, Oxford, Bath, and Bristol, are still upon the turnpike road, owing to the short distance of line yet opened. None of those for Exeter, Plymouth, and Devonport can be expected to join the Great Western Railway until they can be conveyed for a greater proportion of the whole distance, an advantage to which the Bristol and Exeter Railway, now in rapid progress, will be essentially conducive.

It cannot be assumed that the accommodation of the railway, of twenty-two miles, to Maidenhead, has yet considerably augmented the number of travellers, from the more remote towns and cities, which will hereafter be connected with the Great Western line.

It becomes, consequently, of the greatest importance that every effort should be made to extend the length of line; and the directors have pleasure in stating, that the works between Maidenhead and Twyford are now so far completed as to admit of the ballasting being proceeded with, and it is hoped that in about three or four weeks, the laying the permanent way will be commenced, and continued without interruption: all the timber required for it is already converted, and the rails are in course of delivery.

The eastern arch of Maidenhead bridge has been rebuilt by the contractor, and will be ready for materials to pass over it in about three weeks.

The directors intend to have portions of the Maidenhead passenger sheds removed to Twyford, so as to afford temporary accommodation there at the least possible expense, until the line can be opened to Reading.

The works at Sonning have been much retarded by the condition in which they were left by the late contractor, and by the consequent difficulty of sub-letting them to sufficiently responsible persons in that state, and especially in the winter season. This applies more particularly to the west end of that cutting. In the centre of the hill, which had not been commenced, the sub-contractor has steadily performed his engagement, and very considerable progress has been made. The directors finding, that the only security for getting the earthwork completed in the course of the summer, would be by taking it into their own hand, have done so, and are prosecuting the work with the utmost vigour, to attain that object.

By the last returns from the resident engineer, 1,220 men, and 196 horses, were employed on the Sonning cutting, and the company have purchased two locomotive engines to give the required assistance to the work. There are still 700,000 cube yards of earth to remove; and the quantity excavated and carried away by the above-mentioned force exceeded 24,500 cube yards in the week. This quantity will be easily increased to 35,000 cube yards weekly, when the locomotive power is brought into operation, and this will be in about a fortnight.

The embankment immediately beyond Reading was originally intended to have been formed partly from the Sonning cutting. The delay of the contractor in that work has rendered it a matter of necessity to provide side cutting, which will expedite the completion of it, without materially increasing the expense—affording the best prospect of the Railway being opened to Steventon (the nearest point of a turnpike-road to Abingdon and Oxford), at the same time that it is finished to Reading, which will probably be late in the autumn of this year. The works from Pangbourne to Didcot are already in a forward and satisfactory state.

Beyond this place the line has been for some time set out. The land is marked; the surveyors are engaged in purchasing it as it is required for work. Contracts for a distance of fourteen miles from Didcot to Uffington are advertised to be let in next month. The work upon this part is very light. On the twenty-four miles between Didcot and Swindon, one-half is on the surface, or with less than ten feet embankment or cutting. Nearly the whole of the remainder is under fifteen feet, and only ten chains are between twenty and twenty-five feet, which is the maximum.

From Uffington to Swindon, where the Cheltenham line diverges from the Great Western, the plans will be ready for letting the contracts in about six weeks, and the period required for the work will not exceed twelve months.

The Cheltenham line is in active progress. The whole of that portion between Swindon and Cirencester is already let and commenced, and that between Gloucester and Cheltenham in a forward state. Having recently had the financial condition of that company brought under their consideration, the directors have had much pleasure in agreeing, individually, to take some of the shares, in order to prevent the inconvenience of forfeited shares being thrown on the market, and they strongly recommend the same course to the proprietors generally, which will insure the more prompt completion of a line in every respect so valuable to the interests of the Great Western Railway.

Between Bristol and Bath, those works which were let to the same contractor who had the Sonning cutting, and which the company have also taken into their own hands, more especially the tunnels in the neighbourhood of Bristol, have been prosecuted with the utmost vigour. The difficulties that have always been experienced, when it was found necessary to take works out of the hands of a contractor, on account of improper management, have been most strongly felt in this case, from the peculiarly complicated charac-

ter of the operations, caused by the natural impediments of the district. There exists at present no perceptible reason why this portion of the line should not be opened by the end of the present year, and such an anticipation would be expressed with greater confidence, had not the obstructions occasionally occurring in some parts of this district, and the entire dependence of the progress in others upon the season of the year, the state of the weather, and other uncontrollable circumstances, hitherto caused disappointment.

The bridge over the Avon, at Bristol, is in a very forward state, and that at Bath is advertised for tender. The progress of the harbour bridge is still delayed until some new works of the Dock Company permit the drawing off of the water, which is now fixed for an early period next month.

At the Box tunnel no increased difficulties have been encountered, and the material through which the excavation is carried, continues to present every favourable indication of the future easy execution of the work. The contractors have allowed parts of it to fall into arrear, as compared with the stipulated rate of progress. The directors have enforced the penalties, and the works have been proceeded with more efficiently. The line east of this point to Chippenham will be finished some time before the tunnel.

The whole of the line between Bath and Box, and between Chippenham and Swindon, has been set out, and the necessary plans prepared for the purchase of the property, in which the surveyors are now engaged, and the letting of the works will shortly follow.

Active preparations are making for the construction of the permanent way for this portion of the line; sawpits for converting the timber, and the tanks for Kyanizing it, being formed at the dépôt at Bristol, where they will be immediately brought into operation.

The directors have, since the late special meeting, taken means to insure a further supply of locomotive power, looking forward to the wants of the company, both in the Bristol and London divisions of the railway. Specifications and drawings have been prepared, and several of the most experienced manufacturers have been consulted, who are willing to undertake the construction of the engines. Similar provision is also making for carriages, wagons, trucks, &c.

The judgment of the Lord Chancellor, in the bill filed by Eton College against the company, well deserves to be recorded, as a matter of importance to the proprietors. It not only establishes the right of taking up and setting down passengers at Slough, against which the college have ineffectually contended, but it has furnished the most unequivocal contradiction to a report, widely spread, that there had been a breach of faith in the conduct of the directors. This was entirely disclaimed by the counsel of the college in argument, and distinctly negatived by the Lord Chancellor in his judgment.*

* The words used by the Lord Chancellor were as follows :—

“ In the early part of the argument I asked whether there was anything of contract between the company and the college; and if, upon the propositions which were made, Eton College had retired from the contest, and had acquiesced in the provisions of these clauses, considering those clauses would effect their purpose, it might then be to be considered whether it was not an evasion of the contract, which, in that case, would appear to have been entered into between the college and the company. That appears to me by no means to be the case, and nothing in the shape of contract has been brought under the consideration of the Court; both parties are entirely at arms length. The company have a right to every power which is given to them by the Act, and Eton College have no right, unless they can show that the company has done anything contrary to the provisions of the Act: and I cannot say

The legal and equitable right of both parties, and, indeed, of the public, having been thus ascertained by a satisfactory decision, it is to be expected, that some steps will be taken to remedy the serious inconvenience to travellers between Windsor and London, from want of proper accommodation at Slough; and the directors can only add, that nothing on their part shall be wanting to contribute to an amicable arrangement with the college, to attain that object.

The inhabitants of Windsor and the neighbourhood are anxious to carry a branch from Slough to that town, and, if the provost and fellows shall consent, the directors will cheerfully concur in the promotion of it, as being likely to add very much to the traffic of the line. It will bring into contiguity with this railway several places, such as Egham, Englefield, &c., besides increasing the convenience to those who frequent Windsor and the immediate neighbourhood.

Another object, highly deserving the consideration of the proprietors is, the accomplishment of a branch line to unite Oxford with the Great Western Railway. The directors, in the last session, promoted a Bill for that purpose, which, however, after incurring considerable expense, was thrown out by the combined influence of the university and the town corporation, but they have still reason to hope that a future application may be successful.

The accounts of general receipt and expenditure, as well as that connected with the coaching department, to the 31st December last, are appended.

Referring to the estimates of the amount required for the completion of the undertaking, as presented at the last half-yearly general meeting, it will be obviously necessary that the company should apply to Parliament for powers to extend their capital, which the directors recommend they should now be authorized to do, by a resolution of the proprietors.

The directors have the satisfaction to state, that the vacancy occasioned by the death of the late Robert Hopkins, Esq., has been filled up by the election of Robert Hollond, Esq., M.P., who resides in London.

The six undermentioned directors have been balloted out under the regulations of the Act, viz., J. L. Casson, Esq., W. S. Jacques, Esq., George Jones, Esq., Thomas Pycroft, Esq., Charles Russell, Esq., and Henry Simonds, Esq., and they have notified their intention to stand for re-election this day. [They were all re-elected.]

(Signed)

W. U. SIMS, *Chairman.*

General Statement of Receipts and Payments to 31st December, 1838.

Amount received on account of capital	£.	s.	d.	£.	s.	d.
to 31st December, 1838	1,597,400	0	0			
“ for advance on future instalments on shares	33,275	0	0			
				1,630,675	0	0
“ on debentures, &c.				1,526,645	0	0
“ for registration fees, &c.	918	12	6			
For interest, rents, &c.	20,930	13	9			

any of the acts which are brought in evidence before me are of a nature which, in my opinion, are prohibited by this Act of Parliament. Of necessity, therefore, I must refuse this application.”

Less interest paid on loans	7,307	9	4			
				13,623	4	5
						14,541 16 11
Balance of coaching account as per separate statement						18,296 6 8
						<u>3,190,158 3 7</u>

PAYMENTS.

Expenses before the Act to 24th Oct., 1835, as per statement	89,197	11	3			
Payments to 31st Dec., 1835	4,322	1	5			
“ to 30th June, 1836	92,512	9	6			
“ to 31st Dec., 1836	258,470	13	4			
“ to 30th June, 1837	316,500	3	9			
“ to 31st Dec., 1837	650,073	17	5			
“ to 30th June, 1838	578,592	4	1			
<i>Payments from 30th June to 31st December, 1838.</i>						
Land and compensation	62,978	9	3			
Contracts for works	305,560	14	10			
Permanent way, screws, felt, and other materials, draining, tiles, tanks, tools, lighterage, cartage, and labour	85,994	12	6			
Timber contract	72,921	11	2			
Freehold premises in Princes-street, &c.	357	0	5			
Locomotive-engines, carriages, wagons, &c.	49,991	15	4			
Engineering, surveyors, &c.	11,485	7	8			
Advertisements, printing, &c.	320	7	4			
Travelling expenses	473	7	11			
Land valuers, purchasing land	1,698	8	9			
Law charges, conveyancing, costs of title	8,985	17	8			
Stamps for debentures	2,402	7	0			
Parliamentary expenses	10,812	13	4			
Office expenses, direction, salaries, postages, &c.	3,954	14	7			
						<u>2,607,606 8 6</u>
Leaving a balance of						<u>£582,551 15 1</u>

*Revenue of Coaching Account from the 4th of June to the 31st
December, 1838.*

<i>Dr.</i>	<i>£.</i>	<i>s.</i>	<i>d.</i>
To maintenance of way between London and Maidenhead	4,053	16	0
To Locomotive Account, viz:—Coal, coke, repairs, wages to drivers and firemen, &c., oil, tallow, and incidental expenses	9,265	0	0
To Carrying Account, viz:—Wages to guards and con- ductors, police, messengers and porters, clothing, repairs of carriages, oil, tallow, &c.	6,593	17	4
To Government duty, for mileage	2,229	10	1

GRAND JUNCTION RAILWAY.

33

To compensation, returns, and allowances	259	13	10
To <i>General Charges, viz</i> :—Superintendents' and clerks' salaries, rates and taxes, advertising, printing and stationery, and sundries (including travelling expenses)	3,146	19	3
To balance	18,296	6	8
	<u>£43,845</u>	<u>3</u>	<u>2</u>

CR.

By Receipts, viz:—Passengers, parcels, and merchandize	£.	s.	d.
	43,845	3	2

General Abstract of Expenditure—Half-Yearly Statements.

	£.	s.	d.
Expenses before the Act	89,197	11	3
Land and compensation	533,834	7	4
Contracts for works	1,293,720	3	5
Permanent way, screws, felt, and other materials, draining tiles, tanks, tools, lighterage, cartage, labour	315,767	0	9
Timber contract	72,921	11	2
Freehold premises in Princes-street	18,816	8	7
Locomotive-engines, carriages, &c.	118,203	12	8
Engineering, surveyors, &c.	72,454	4	9
Advertisements, printing, &c.	2,290	4	3
Travelling expenses, &c.	2,441	0	7
Land valuers, purchasing land	7,405	0	3
Law charges, conveyancing, and costs of title	24,212	17	0
Stamps for debentures	7,225	7	0
Parliamentary expenses	25,367	6	2
Engraved map of the Great Western Railway	630	0	0
Office expenses, direction, salaries, postages, &c.	23,119	13	4
	<u>£2,607,606</u>	<u>8</u>	<u>6</u>

GRAND JUNCTION RAILWAY.

Special General Meeting, held at the Cotton Sales' Room, Liverpool, Wednesday, Jan. 30, 1839; JOHN MOSS, Esq., in the Chair.

REPORT.—The result of the half-year's business, ending December 31, 1838, which the directors have now the pleasure of submitting to the proprietors, will be found not only satisfactory on the present occasion, but also encouraging as regards the future prospects of the undertaking.

The gross receipts during the period in question have been—

For coaching, including the conveyance of passengers, horses, and carriages, with the parcel and post-office business	£161,410	6	3
Showing an increase of 44,669 <i>l.</i> 15 <i>s.</i> 8 <i>d.</i> over the corresponding period of 1837, and of 51,507 <i>l.</i> 14 <i>s.</i> 5 <i>d.</i> , as compared with the first six months of 1838.			
For carriage of merchandise and tonnage of coals	13,766	14	9
For carriage of live stock	2,862	8	6

Making a total of £178,039 9 6

Part of the increase in the passenger business may be ascribed to the opening throughout of the London and Birmingham Railway, in the month of September last; and the subsequent completion of the North Union line to Preston, in November, may also have brought some additional travelling. The accession of income to be derived from these sources may reasonably be expected to proceed in an increasing ratio, as the accommodation afforded to the public becomes more thoroughly developed, and more generally known.

A gradual increase will be found to have taken place in the amount of merchandise traffic; the directors have, however, been limited to such an extension of business only, as their means have allowed them to transact without detriment to the general service of the line. The arrangement for the despatch of merchandise going beyond Birmingham, which the London and Birmingham Company are now understood to be completing, will enable this company before long to obtain a considerable extension of business, to provide for which the needful preparations have been ordered by the directors. In the mean time, the gradual advance hitherto exhibited shows that the advantages offered by the railway for conveyance of goods are daily becoming more generally appreciated.

The additions made to the stock of engines (and which are still in progress) have contributed to improve the regularity of the trains; as well by affording the means of keeping the engines in a higher state of efficiency, as by facilitating the use of assistant power, in cases of their occasional failure, or under unfavourable circumstances of weather. But it should be remarked, that several of the trains are now, to a certain extent, dependent upon others joining them from the London and Birmingham and North Union Railways. In cases of accidental detentions on these lines, from causes similar to those which at times affect the Grand Junction trains, and in the transfer of passengers and carriages, delays have taken place which may be expected to recur, although much has been done to render them less frequent. This is indeed a condition from which no travelling dependent on other conveyances can be exempt. During the winter the trains are also often delayed by the late arrival of mails from the turnpike roads, especially by the Bristol mails running to meet the three o'clock, A.M. train from Birmingham, for which it has been necessary to wait almost daily.

Since the last general meeting the completion of the new passenger station at Birmingham has enabled the directors, in concert with the London and Birmingham Company, by a joint arrangement for the arrivals and departures of the trains in the respective stations of each company, as well as by running the carriages throughout, to add materially to the comfort of travellers. The supply of refreshments to passengers in the stations has been found of great convenience; and measures are in progress to render the accommodations in the Grand Junction Company's station still more complete and extensive.

The directors are desirous of adverting to complaints which have reached them from the districts adjacent to the intermediate stations on the line, of the charge said to be incurred in the receipt of parcels. This may be in part an unavoidable consequence of the removal of the coaches which formerly passed through the neighbourhoods in question; as far as the company are concerned, they can only state that their highest charge on small parcels, under 18lbs. in weight, is 1s. 6d. for the entire distance; for any distance under 35 miles, 6d.; and under 50, 1s., including booking; which cannot be regarded as unreasonable. The directors are most anxious to be apprized of any irregularity in the deliveries, which it is in their power to correct.

The expenses during the last half-year, which amount to 53 per cent., exclusive of the interest on loans, include all charges, as well for current repairs, as for the renewal of engines, which it has been decided to carry to the amount of income, as it appeared at the last half-yearly meeting that a difference of opinion existed amongst the proprietors as to the correctness of transferring any portion of such outlay to the capital stock of the company. The proprietors, it is hoped, will share the satisfaction of the directors in noticing the large surplus of nett income remaining to be divided, after all charges have been provided for. As regards the proportion of expenses to gross receipts, the directors wish, however, to state their conviction, that in a business of this nature, where the accommodation to be afforded to the public is a prominent consideration, and when these continually increasing demands must be consulted, although at some sacrifice of economy in the working, there is no reason to calculate that the ratio of expense can ever be reduced to the point which may have been anticipated in the infancy of such undertakings. Nor is this, when justly considered, any ground for disappointment; when it is proved that the convenience offered to the public, although requiring a large expenditure, procures such an amount of total receipts on this line as allows a profitable return to the proprietors, after all charges are deducted.

The charge for maintenance of way having formerly been borne by the contractors for the works, and consequently not occurring in previous accounts, is 14,570*l.* for the six months ending December 31. The directors have pleasure in reporting that they have now contracted for this, at the rate of 20,500*l.* per annum, or about 250*l.* per mile, with Mr. Allcard, whose high character and experience in this department give reason to conclude that the arrangement will be found advantageous as well as economical. At this rate of payment, the cost for the ensuing half-year would be reduced by more than 4,000*l.*

The nett surplus for the half-year, amounting to 73,714*l.* 16*s.* 9*d.*, will enable the proprietors to divide 6*l.* per cent. on the capital, leaving a balance of 1,656*l.* to be carried to the next half-year's account; and the directors recommend that a dividend be declared accordingly. The receipt from Sunday travelling for the half-year is equal to 9*s.* 7*d.* per share, and 1*s.* 1*d.* per half-share.

A statement of the expenditure on capital account, with a valuation of the stock, as ordered by the proprietors on the 1st of August, 1838, is now to be laid before the meeting.

The directors will now proceed to acquaint the proprietors with the result of their deliberations on the subject of the improved communication with Liverpool, intended to have been effected by the Fidler's Ferry branch. Various circumstances, which it is unnecessary to particularize, have induced the directors to recommend its abandonment by the proprietors. As a substitute for it, possessing most of the advantages of the branch in question, they would advise the formation of a line from Warrington to Huyton, whereby the three inclined planes would still be avoided, and a saving of 3 miles in distance effected; while the cost of this communication will be one-third less than of that originally designed by Fidler's Ferry. The directors accordingly recommend that they may be authorized to apply to Parliament in the next session for a branch line from Warrington to Huyton; the necessary plans, &c., having been already prepared for the purpose.

Although the correspondence between this company and the Manchester and Birmingham Company, which has been circulated amongst the proprietors, will have acquainted them generally with the respective positions

of the two companies, the directors think it desirable to lay before them, on this occasion, a short summary, in a separate report, of the particulars of the question on which they are finally at issue. Under the circumstances detailed in this statement, it is hoped that the proprietors will not refuse their confidence to the directors, but will empower them to take such steps as a further consideration of the subject, and the course of proceedings in Parliament, may seem to render expedient.

(Signed)

JOHN MOSS, *Chairman.*

LONDON AND BIRMINGHAM RAILWAY.

Eleventh Half-yearly General Meeting, at Dee's Royal Hotel, Birmingham, 1st February, 1839; GEORGE CARR GLYN, Esq., in the chair.

REPORT.—The directors in their present report have the pleasure to record the opening of the entire line on the 17th September, in conformity with the expectations which were held out to the proprietors at their last meeting. The number of passengers conveyed between the 1st of July and the 16th of September, was 149,616, equal on an average of 77 miles (the length of railway then in operation), to 945 passengers per day for that distance. The number conveyed between the 17th of September and 31st of December, was 151,941, equal on an average of 112 miles to 797 passengers per day, for the whole distance. The total number in the half year was 301,557, equal on an average to 1,633 per day.

According to the accounts which are now to be laid before the proprietors, it will appear that the receipts from revenue between the 20th July, 1837, when the railway was first opened, and the 31st December last, were	270,855 17 11
The payments in the same time, including interest, 33,854 <i>l.</i> , and a reserve of 16,812 <i>l.</i> , to meet the depreciation of stock, were	154,396 19 7

Leaving a net profit of	£116,458 18 4
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on which the directors recommend that a dividend should be declared of 3*l.* 10*s.* per 100*l.* share, equal to 109,375*l.*

The receipts, from the 1st of July to the 31st of December, for the carriage of passengers (deducting the intermediate road coaching), parcels and merchandize, were	203,415 3 5
The charges of maintenance of way, locomotive, police, and coaching departments (mileage duty included), in the same time, were	72,605 8 3

Leaving a net receipt of	£130,809 15 2
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subject to a reserve for depreciation of stock, and for interest on loans.

The directors, looking to the time of year when the last opening occurred, and to the very limited quantity of goods which the company have been enabled to carry with their comparatively inadequate means of accommodation for this description of traffic, may confidently anticipate that when the sheds, now in progress at the London and Birmingham stations, are completed, and the wagons built which have been ordered, the amount will be greatly increased. The principle which the directors have adopted, is to throw the railway open to all carriers on such a reasonable toll as will enable

them to carry on their business in fair competition with the canals, the company, at the same time, being carriers on their own account as the surest guarantee to the public that fair and reasonable rates will be charged, the same principle, in fact, as that so successfully adopted by the late Duke of Bridgewater on his canals.

Against the large accession of revenue upon which the directors have a right to calculate, they expect a considerable addition to the cost of "maintenance of way." The proprietors are probably aware that the contractors are bound to keep the portions of the railway works for which they have severally contracted, in repair for twelve months from the date when they are given up to the company. The railway between London and Tring (a distance of 32 miles), was the only portion liable to this charge in the last six months: but in the month of April the maintenance of a further distance of 51 miles will become chargeable to the same account, and for the whole line in October. The directors calculating, therefore, on this prospective expense, and having no certain data for estimating the amount of it, feel themselves called upon to recommend that the balance of 7,083*l.* 18*s.* 4*d.* should be reserved to meet future contingencies, in addition to the 16,812*l.* already provided for the depreciation of locomotive and coaching stock, making 23,895*l.* 18*s.* 4*d.* retained from the net revenue.

With reference to the outlay under the head of police and coaching, the directors still considering the safety of passengers of more importance than economy, have maintained their establishment of police, with a view to this paramount object, on a much larger scale than they are of opinion will be necessary when the winter months are passed, and the embankments are more consolidated; and they may state, as a satisfactory proof of the advantage of this precautionary measure, that although the works of the railway have proceeded incessantly whilst the trains were running, there has been neither loss of life nor serious accident to any individual passenger. Under the other heads of expense, every economy has been used, consistent with due efficiency in the management, and the amount will be found at least as moderate as on any other railway at present open to the public.

The directors at the last general meeting announced that it was their intention to apply to Parliament, in the present session, for powers to increase the capital of the company, and that they proposed to raise the money which might be required in the mean time by loans. In pursuance of the arrangements which were then communicated to, and sanctioned by, the proprietors, the directors have borrowed 500,000*l.*, principally on notes payable twelve months after date, and it will be necessary not only to provide means for the repayment of these notes as they fall due, but such a reserve of disposable capital as shall relieve the company from the necessity of renewed application to Parliament whenever occasions arise for an expenditure of unquestionable utility. The Birmingham and Derby, the Birmingham and Gloucester, and the Midland Counties Railway Companies have severally submitted propositions to the consideration of the directors, with reference to stations at the points where they join the London and Birmingham Railway, and it is probable that similar propositions may be made from other quarters. The cost of accommodation which it may in these cases be expedient to provide for the respective companies, and for which they will make an adequate return to the London and Birmingham Railway, is one of the most obvious occasions for a future beneficial outlay of capital to which the directors can refer.

With this impression of the existing and probable future demands on the company's funds, the directors can have no hesitation in recommending that power should be taken for raising an additional 1,000,000*l.* of capital, by

the creation of new shares, and that the money which may from time to time be required, should be obtained either by calls on the shares, or by loans in anticipation of calls.

Arrangements have been made for the transfer of the Grand Junction Railway carriages to the London and Birmingham Railway, and for a corresponding transfer of this company's carriages to the Grand Junction Railway, and for the alternate use of the respective stations. The directors are anxious, as they always have been, to adopt any measures in the interests of the two companies, the tendency of which may be to promote the public accommodation.

The hotels in front of the Euston station, to the construction of which the directors adverted in their last report, are in so forward a state, that their completion may be expected in the summer of this year. The committee specially charged with the superintendence of these establishments, have made considerable progress in the plans for their future management, and have no doubt that the arrangements generally will be found effectual for the accommodation and comfort of railway travellers, and afford at the same time a liberal remuneration to the proprietors.

General Account of the Receipts and Disbursements of Cash by the London and Birmingham Railway Company, to December 31st, 1838.

Dr.

RECEIPTS.

	December 31st, 1838.	£.	s.	d.
To capital account for sums received		4,978,120	4	10
— revenue account ditto		298,337	0	10
		<u>£5,276,457</u>	<u>5</u>	<u>8</u>

Cr.

DISBURSEMENTS.

	December 31st, 1838.	£.	s.	d.
By capital account for sums disbursed		5,018,816	16	3
— revenue account ditto		135,915	10	9
— balance of cash, viz. —				
In deposit Stamp-office	2,000	0	0	
Placed on loan at interest	55,000	0	0	
Glyn and Co.	16,382	2	6	
Bank of Liverpool	17,967	13	2	
Moilliet and Co.	10,841	7	4	
Birmingham Banking Company	18,598	6	2	
Heywood and Co.	33	4	0	
Bank of Manchester	902	5	6	
		<u>121,724</u>	<u>18</u>	<u>8</u>
		<u>£5,276,457</u>	<u>5</u>	<u>8</u>

Capital Account.

Dr.

	December 31st, 1838.	£.	s.	d.
To stock, viz. — Land and compensation	637,869	6	7	
Works of road and stations	3,830,212	17	8	
Locomotive department, viz., engines and tenders, tools and implements	67,093	16	6	
Stores account	1,510	0	0	

BIRMINGHAM RAILWAY.

39

	£.	s.	d.	£.	s.	d.
Carrying department, viz.—coaches, trucks, horse-boxes, wagons, cranes, &c.	127,249	12	4	4,663,935	13	1
To charges, viz.—Obtaining Act of Incorporation	72,868	18	10			
Law charges for general business	10,339	9	3			
Conveyancing and land agency	11,027	5	10			
Engineering	85,802	15	5			
Advertising, printing, direction, office, salaries of secretaries, &c., and sundries (including travelling)	43,727	13	1			
To debenture charges (including ad valorem duty)	10,077	18	0	223,766	2	5
To interest on loans previously to general opening on 17th Sept.	121,037	2	9			
				131,115	0	9
				<u>£5,018,816</u>	<u>16</u>	<u>3</u>
<i>Cr.</i>						
December 31st, 1838.	£.	s.	d.	£.	s.	d.
By calls on 100l. shares	2,249,225	0	0			
Ditto 25l. ditto	124,525	0	0			
				2,373,750	0	0
By loans on debentures	2,125,000	0	0			
Ditto on notes	365,500	0	0			
Ditto on account	75,967	12	0			
				2,566,467	12	0
By sundries, viz.—Produce of sale of forfeited shares	4,444	15	10			
Fines, land, and materials resold, &c.	5,273	3	7			
Interest on calls in arrears, Exchequer bills, and bankers' balances	28,184	13	5			
				37,902	12	10
By balance				40,696	11	5
				<u>£5,018,816</u>	<u>16</u>	<u>3</u>

Revenue Account.—Six Months, ending December 31st, 1838.

<i>Dr.</i>	December 31st, 1838.	£.	s.	d.	£.	s.	d.
To maintenance of way between London and Tring, from 17th Sept.		7,175	14	4			
To locomotive account, viz.—Coal, coke, repairs, salaries, wages, oil, tallow, waste, and incidental charges		16,091	5	1			
To carrying account, viz.—Salaries, wages of police, porters, &c. Stationery, repairs, gas, oil, and tallow		25,538	3	5			
Mileage duty		8,816	9	4			
To general charges, viz.—Engineering, law charges, advertising, printing, direction, office, salaries, secretaries, clerks, and sundries (including travelling)		14,983	16	1	72,605	8	3

BIRMINGHAM RAILWAY.

	£.	s.	d.	£.	s.	d.
To reserve for depreciation of stock, viz.—locomotive stock	5,007	0	0			
Carrying ditto	6,305	0	0			
				11,312	0	0
To interest on loans from 17th Sept.				33,854	15	5
Balance				116,458	18	4
				<u>£234,231</u>	<u>2</u>	<u>0</u>

<i>Cr.</i>		December 31st, 1838.			£. s. d.		
By receipts, viz.—passengers, parcels, mails, and merchandise					219,973	8	0
Deduct for intermediate coaching					16,558	4	7
					203,415	3	5
By interest on cash balances, from 17th Sept.					961	19	4
					204,377	2	9
By balance of revenue account to 30th June					29,853	10	3
					<u>£234,231</u>	<u>2</u>	<u>0</u>

Reserve Account for Depreciation of Stock (December 31st, 1838).

<i>Dr.</i>							
To balance							£16,812
<i>Cr.</i>							
By reserve, June 30, 1838		Locomotive.		Coaching.		Total.	
By „ December 31		£3,500		£2,000		£5,500	
		5,007		6,305		11,312	
		<u>£8,507</u>		<u>£8,305</u>		<u>£16,812</u>	

Balance (December 31st, 1838).

<i>Dr.</i>		£. s. d.		
To cash account		121,724	18	8
To capital account		40,696	11	5
To sundry accounts for balances due to the company		11,332	1	8
		<u>£173,753</u>	<u>11</u>	<u>9</u>
<i>Cr.</i>				
By revenue account		116,458	18	4
By reserve account		16,812	0	0
By loan creditors' account		33,854	15	5
By sundry accounts for balances due by the company		6,627	18	0
		<u>£173,753</u>	<u>11</u>	<u>9</u>

R. CREED, }
C. R. MOORSOM, } *Secretaries.*

NORTH MIDLAND RAILWAY COMPANY.

Fifth Half-yearly General Meeting of the Court of Proprietors, at the London Tavern, 8th February, 1839; GEORGE CARR GLYN, Esq., in the chair.

REPORT.—The progress which has been made in this undertaking, since the period when the directors had last the pleasure of meeting the proprietors, will be seen by reference to the details embodied in the report of the engineer, about to be read. These details comprise matters of the greatest importance; and the directors beg to refer the proprietors to a paragraph in their last report, in which the attention of the meeting was requested to the particular account of each contract, "in order to enable them to judge of the present position of the undertaking and of its future progress." If the proprietors will compare the present with the last report of the engineers, they will find that the progress made in the intervening six months, is amply sufficient to satisfy the most sanguine expectations. The directors will, upon this as upon all occasions, carefully avoid making any statement calculated to excite undue expectations; but in the present state of the works, and looking to the energy and activity which is displayed on all sides, they feel it right to express a confident belief, that the whole of the contracts will be completed early in 1840, so as to enable the directors to open the larger portion of the line in the spring, and the remainder in the summer of that year. With very few exceptions, the contractors are conducting their various operations with vigour and judgment, and no serious difficulty has arisen with any of them up to the present period, a circumstance upon which the directors cannot but congratulate the proprietors. Probably this position is one of the many benefits which arise to this undertaking, from the unanimity prevailing in all the various departments connected with its administration, as well as the great advantage derived from the experience which has been obtained by continually observing the working of other railways.

The directors have likewise the pleasure of reporting, that they have recently encountered no serious impediment in obtaining possession of land, &c., required for the railway, although, in the complicated arrangements requisite to be made with so many separate parties, some obstacles naturally have arisen which have been successfully overcome. Only two cases have occurred wherein the company have been subject to legal proceedings; in both these instances the view entertained by the directors has been sustained by decisions in their favour.

As a matter of statistical interest, connected with the above remarks, it may be stated, that the quantity of earthwork executed during the last six months, amounts to more than 2,700,000 cubic yards, being at the rate of upwards of 450,000 cubic yards per month, leaving about four millions to be executed. There are 8,600 men employed on the line, and a corresponding number of horses and engines.

The proprietors may now, therefore, safely and with confidence calculate upon the period when they will receive a return for their outlay, and a recompense for the perseverance and energy with which they have supported this great national undertaking. What the amount of that return will be, it is impossible to ascertain with precision, but this certainty exists, that railway travelling will be henceforth the chief mode of communication through the principal districts of this kingdom; and the experience of existing railways shows beyond doubt that, notwithstanding the great cost, good lines of railway, similarly circumstanced to this, will afford a cheap as well as expeditious mode of conveyance to the public, and at the same time yield ample remuneration to the proprietors.

The directors of this company have from the commencement entertained

a very high opinion of the capabilities of success which this undertaking affords, and they now speak with greater confidence upon this subject, having lately caused the calculations of the traffic to be revised; this has been done with the most minute investigation, and care has been taken to avoid all species of exaggeration. The result convinces them that the profits of this line will yield to few, if any, either now completed or in progress; and the return to the proprietors will certainly be greater than was originally calculated upon, notwithstanding the additional capital which it will be necessary to raise. Upon this subject the directors refer to the communication made to the proprietors at a former meeting, at the time they became first aware of the necessity of this addition, and they now see no reason for doubting that the calculation upon which they made that statement is substantially correct, as affording ample means for the opening of the line; and they repeat their pledge, that no expenditure shall be incurred which is not fully justified by the necessity of insuring the durability and efficiency of the works. Final arrangements are made by the three companies, viz., the North Midland, the Midland Counties, and the Birmingham and Derby Company, for the construction of adjoining stations at the latter town, and for a transfer of a portion of the line of railway belonging to the Birmingham and Derby Company, to the North Midland Company, rendered necessary by the alteration of the site of the station.

The directors are under the necessity of applying to Parliament during the present session for leave to make a deviation line into Leeds, of about three miles in extent, to which no serious opposition is apprehended. It will be less costly, and more favourable for the general traffic than the original line. With the concurrence of the proprietors, the directors will embrace the opportunity thus afforded of making application for the additional amount of capital.

With reference to the resolution of the last meeting, which empowered the directors to appropriate the sum of 500*l.* towards the expenses of making preliminary surveys for a line of railway from Newcastle to Edinburgh, the directors have to report that no part of this sum has yet been called for. The project has been taken up with much zeal and activity by many spirited and influential individuals at both places. A provisional committee has been formed, under whose directions Mr. Stephenson has made the required survey, upon which he has published a report, detailing the advantages of this particular line, whereby a direct communication will be afforded from the metropolis and the West of England, by the London and Birmingham, Midland Counties, Birmingham and Derby, North Midland, York and North Midland, and the Great North of England lines, to Edinburgh and Glasgow.

Mr. Stephenson has likewise, at the request of several influential parties at Leeds and Bradford, made a survey of the ground between those towns, with a view of forming a railway to join the North Midland at their proposed station at Leeds.

Other branch railways are in contemplation, which will act as auxiliary lines to this undertaking.

By the statement of accounts now to be laid before the proprietors, it will be seen that—

The receipts to the 31st December, 1838, were . . .	£1,136,687	13	7
The disbursements	961,141	16	3

Leaving a balance at the disposal of the company . . .	£175,545	17	4
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By the 117th section of the Act of Incorporation, it is provided, that

one-third of the remaining directors who did not retire at the meeting in February last, shall now go out of office, and five directors be elected to supply the vacancy.

The proprietors, in exercising such power of election, will advert to the provisions of the Act, by which every director so retiring, is declared eligible for re-election.

The following are the directors who now go out of office, Mr. Beckett, Mr. Hubbard, Mr. Laycock, Mr. Pickersgill, and Mr. Stansfeld.

General Account of the Receipts and Disbursements of the North Midland Railway Company, to the 31st December, 1838.

31st December, 1838.	Cr.	£	s.	d.
By cash received for calls		777,775	0	0
By profit on Exchequer-bills		55	0	0
By interest on Exchequer-bills, loans, and for shares in arrear		6,288	13	7
By cash, in anticipation of calls		3,700	0	0
By cash on debentures		348,850	0	0
By rent of premises in Hunalet-lane		19	0	0
		<hr/>		
31st December, 1838	Dr.	1,136,687	13	7
To payments before the Act was obtained, and additional disbursements not then included	£.	40,860	9	6
To land and compensation		246,985	16	4
To contracts for works		587,082	9	0
To iron rails		23,026	19	8
To chairs		6,168	13	9
To sleepers		3,660	17	6
To wagons		142	10	0
To engineering, consisting of expenses of office at Chesterfield, salaries, travelling expenses, &c.		28,014	17	1
To surveying and land valuing		956	6	6
To law charges for general purposes		6,060	6	6
To advertising, printing, and stationery		1,538	7	10
To direction		4,700	0	0
To sundries, including travelling expenses, &c.		2,005	8	10
To hire of police		250	4	0
To office charges, including salaries to secretaries, clerks, rent, and incidental expenses		4,301	19	8
To Parliamentary and law charges, in respect of opposition to Midland Counties Extension Bill, and general Parliamentary business for the new Act		3,306	10	1
To stamps for debentures, 2,000 <i>l.</i> , for transfer of shares, 80 <i>l.</i>		2,080	0	0
		<hr/>		
		961,141	16	3
To cash at the disposal of the company		£175,545	17	4

Abridgment of Mr. Swanwick, the resident engineer's report, respecting the contracts:—

No. 1, *Derby*, 62 chains, consists of an embankment of about 110,000 cubic yards, a viaduct over the Nottingham canal and turnpike-road, and a bridge for carrying the Derby and Mansfield turnpike-road over the railway. The embankment will be immediately begun, and completed by the autumn. In the bridges considerable progress has been made.

No. 2, *Duffield*, 3 miles and 38 chains.—Nearly the whole embankment, amounting to 145,000 cubic yards, is completed, the quantity now remaining not exceeding 15,000 cubic yards. The bridges, of which there are only two of any magnitude, are in great forwardness.

No. 3, *Milford*, 2 miles and 20 chains.—Excavation of 165,000 cubic yards, of which 25,000 only remain to be excavated. Of the tunnel, 836 lineal yards, upwards of 500 yards are done, and the progress is about 45 lineal yards per month. The bridges are above two-thirds finished.

No. 4, *Belper* (South), 45 chains.—Excavations of 90,000 cubic yards, 50,000 remain to be excavated. The small quantity of masonry to be executed in this contract is in a forward state.

No. 4 (a), *Belper* (North), 102 chains.—Excavation of 135,000 cubic yards to be deposited in an embankment at the north end of the cutting. The quantity excavated is upwards of 55,000, leaving about 80,000. Progress, about 8,000 yards per month.

No. 5, *Bull Bridge*, 2 miles and 21 chains.—One of the heaviest on the line, nearly 400,000 cubic yards of excavation; considerably more than one-half has been executed. A short tunnel has been substituted in one case in place of open cutting, but without any increased cost to the railway company. The bridges are numerous and heavy, and in a very forward state; the whole will probably be completed by the end of the year.

Cromford Canal Aqueduct.—A satisfactory arrangement having been made with the Cromford Canal Company, the most active preparations are being made for proceeding with this work.

No. 6, *Lodge Hill*, 2 miles and 67 chains.—The excavation about 340,000 cubic yards, of which not more than 120,000 remain unfinished. Of the tunnel about 250 yards long, 147 yards are completed: it will probably be completed in less than seven months. All the bridges are nearly completed.

No. 7, *South Wingfield*, 4 miles and 33 chains.—Excavation about 1,000,000 of cubic yards, including the excavation of river courses. The quantity remaining amounts to less than 250,000, of which not more than 120,000 is to be deposited in embankment. There is no reason to fear the earthwork will not be completed this year; the bridges nearly all finished, and a portion of the permanent way laid.

No. 8, *Clay Cross Tunnel*, 1 mile and 4 chains (tunnel 1 mile).—The total length of tunnel, the great obstacle to early completion, executed is upwards of 1,100 yards, leaving only 660 to do. By the present rate of progress, this would be completed in less than six months; but there is every reason to anticipate, with confidence, it will be completed before the end of the year.

No. 9, *North Wingfield*, 3 miles and 34 chains.—Excavation about 350,000 cubic yards, of which remain about 20,000. The bridges and approaches are very nearly completed, and the greater proportion of the permanent way is laid.

No. 10, *Chesterfield*, 1 mile and 42 chains.—Excavations are 200,000 cubic yards, quantity remaining about 60,000. Greater portion of masonry completed.

No. 11, *Whittington*, 2 miles and 60 chains.—Earthwork 368,000 cubic yards; quantity remaining less than 130,000. The river-bridges, the heaviest portion of the masonry, are either completed or very nearly so; the greater number of the road-bridges likewise, are already built.

No. 12, *Staveley*, 3 miles.—Excavations 520,000 cubic yards; remaining about 160,000. More than two-thirds of the masonry is executed.

No. 13, *Eckington*, 2 miles and 40 chains.—Earthwork about 140,000 cubic yards; quantity remaining is scarcely 35,000. The greater proportion of the masonry is completed.

No. 14, *Beighton*, 2 miles and 76 chains.—Earthwork 250,000 cubic yards; remain scarcely 70,000. Greater portion of the masonry completed.

No. 15, *Treeton*, 2 miles and 44 chains.—Earthwork 364,000 cubic yards; remain about 120,000. Masonry in a forward state.

No. 16, *Ickles*, 1 mile and 33 chains.—Earthwork inconsiderable, about 80,000 cubic yards, of which 45,000 are remaining. Masonry, the heaviest portion which includes the viaduct over the river Dun Valley, consisting of thirty arches of from twenty-five to thirty feet span, and a bridge of two arches of seventy feet span each, over the river. One-half of it is completed.

No. 17, *Greasborough*, 1 mile and 72 chains.—The works along the greater portion are prepared for three lines of railway, one for the use of the Sheffield and Rotherham Company, to connect that line with the Greasborough coal-field. This third line is to be paid for by the Sheffield and Rotherham Company. The excavations amount to 333,000 cubic yards; quantity remaining about 50,000. Most of the bridges are completed, and a single line of permanent way is laid from the Sheffield and Rotherham Railway as far as the branch leading to Lord Fitzwilliam's coal-field.

No. 18, *Kilnhurst*, 2 miles and 15 chains.—224,000 cubic yards; unfinished, about 60,000. Bridges nearly finished, and a portion of the permanent way laid.

No. 19, *Swinton*, 1 mile and fifty chains.—Earthwork 234,000 cubic yards; quantity remaining less than 75,000. The bridges are forward.

No. 20, *Darfield*, 3 miles and 53 chains.—Earthwork 500,000 cubic yards; remain 170,000. It has been found expedient to introduce a short tunnel of about 140 yards in length in one of the cuttings on this contract, but the consequent additional cost will be very trifling, if any. The masonry, not considerable, in an advanced state.

No. 21, *Houghton*, 4 miles and 17½ chains.—Excavation 336,000; quantity remaining about 120,000. Masonry in an advanced state.

No. 22, *Royston*, 2 miles and 74 chains.—Earthwork 255,000 cubic yards; quantity remaining 125,000. Several of the bridges are built.

No. 23, *Notton*, 2 miles and 2 chains.—The principal works are a tunnel 600 yards in length, a viaduct of 110 yards, and earthwork of 327,000 cubic yards, of which 180,000 remain to be executed. Of the viaduct nearly the whole of the piers are built as high as the level of the impost. Of the tunnel, almost entirely through coal-measure and sandstone, about one-half may be considered as executed. The earthwork remaining is considerable, and will require exertion to effect its completion by the required period.

No. 24, *Oakenshaw*, 3 miles, 41½ chains.—A viaduct of five arches of 60 feet span each, and a very heavy excavation and embankment. The piers and abutments are nearly completed. The contractor expects to turn the arches so as to allow of a passage across the viaduct in the course of the ensuing spring. The embankment is the highest on the line, but the

material furnished is of excellent quality, consisting chiefly of sandstone rock. Excavation about 680,000 cubic yards; quantity remaining about 420,000, of which about 130,000 go to spoil. This contract will require the greatest exertions to finish it within the period specified, the 1st January, 1840.

No. 25, Altofts, 3 miles and 22 chains.—The principal works are—in masonry, a viaduct over the river Calder and the canal of the Aire and Calder Navigation Company, and in excavation and embankment, 596,000 cubic yards. In the masonry the foundations of most of the piers and abutments are laid, and up to a considerable height. Of the earthwork the quantity now remaining to be deposited in embankment is about 280,000 yards.

No. 26, Methley, 1 mile and 60 chains.—Earthwork only 172,000 cubic yards; 138,000 remain. May be completed by the end of the year; masonry inconsiderable.

No. 27, Woodlesford, 2 miles and 32 chains.—On this contract considerable progress has been made since the period at which it was let, which was not before last summer. Earthwork 284,000 cubic yards; remain about 180,000. From the progress made, there is no doubt of its being completed in time.

Deviation into Leeds.—All necessary steps have been taken for an application to Parliament in the present session, and considerable progress in the negotiations with landowners. Between the Derby contract and the Houghton contract, near Barnsley (52 miles), the present rate of progress and aspect of each contract leave no doubt that the whole will be completed and ready to work in the spring of 1840. As regards the remainder of the line between the Royston contract and Leeds, present appearances do not afford the same confident grounds to assign an equally early period for its completion, though the contractors are under heavy penalties to do so. With regard to the probable actual cost of the works, it may be stated, that there is every reason to anticipate that the amount of extra works, which in most undertakings of this magnitude constitute a large per centage upon the original contract amounts, will, in the case of this line, be very inconsiderable. The average number of cubic yards of earthwork executed per month during the last half year has been 450,000.

LONDON AND CROYDON RAILWAY COMPANY.

Special General Meeting held in London, 12th day of January, 1839.

REPORT.—Gentlemen,—Somewhat confident expectations were held out when we met the proprietors in September last, that two main portions of the railway, namely—the earthwork and masonry of the line, would be finished considerably before the close of the year, and there is accordingly no circumstance connected with the appeal which we are compelled to make to the proprietors on the present occasion, which has caused more regret, than our inability to state that the expectations entertained at that period have been entirely realized. On examination, however, of the section annexed to the engineer's report, to be read this day, of earth and brick-work remaining to be done, the particulars of which are stated in the appendix to that report, it will be found that the quantity remaining in the cutting at New-cross, will require no more than three weeks, and that at Forest-hill from six to eight weeks; the remainder of the cutting along the line is of trifling amount. The bridges are completed except one situated near the junction of the New-cross and Forest-hill contracts, the piers of which are nearly ready for the centering. The disappointment with regard to earth-

work has been owing, first—to the cost above his contract price, incurred by the contractor at Forest-hill, owing to the unexpected difficulty of the remainder of the work, to his losses, which terminated in his failure, and finally by the abandonment of the contract, early in November. The completion of the work was further delayed by the necessity of putting it into other hands. The New-cross and Forest-hill contracts have both been retarded also, by the occurrence of a series of weather very unfavourable to work carried on in such ground; the quantity of earth-work at Forest-hill has also been considerably increased owing to the treacherous nature of the soil; slips have taken place to some extent in the deeper part of the cuttings, and it has consequently been necessary to increase the slopes along a portion of this contract. About 4,000 cubic yards out of the whole contents of the New-cross contract, viz., 590,000, only remain to be excavated in the cutting, and about 4,000 on the slope. About 19,000 yards are remaining in the bottoms of the Forest-hill contract, to which must be added about 35,000 required to be taken out by the increased slope, the entire contents of this contract (which commenced in February last) having been 650,000 cubic yards. Of the seventeen and half miles of permanent way one-third is already laid, and the rest of this work will make considerable weekly progress proportioned to the clearing out of the cuttings in the two main contracts. The other works required for completing the line are parts of retaining walls at Croydon and Sydenham; dressing and soiling the sides of the embankments and turfing the sides of the cuttings; adjusting the levels of the embankments where subsidence has taken place after formation, and ballasting the remainder of the line.

Upon the usual periodical examination of the state of the works previous to the present meeting, and on comparing them with those of any other main line of railway in England, in which public works of this kind must necessarily be of a very durable character proportioned to the frequency of the traffic and the great speed and regularity required, we are fully satisfied with the design, execution, and solidity of all the works. Calculating upon the proportion of dry weather usual in the first four months of the year, and upon a full instead of a sparing supply of pecuniary means, we see no reason to question the statement made by the engineer, namely, that the whole line of railway from the station at Tooley-street to Croydon may be opened for traffic in the course of April next. For any further information as to the state and progress of the works, we beg to refer the proprietors to papers prepared by the engineer, consisting of a report on the works, a section showing the present advanced state of the earth-work, and an appendix, which we have instructed him to prepare, in order fully to support and explain his account of the further sums required to complete the work—the appendix states under each head, in detail, the measurements and prices of the works remaining to be done, and the particulars of carriages, tenders, engines, iron-rails, and other supplies. Referring to the further amount of money required, the directors beg leave to explain that on examination of the works, about the beginning of November, they considered that the available funds when compared with the works and contracts remaining to be paid would not be sufficient. Having understood however that the completion of the earth-work of the New-cross and Forest-hill contracts, and of the line generally, might be calculated upon in the course of November, they deferred until such an advance of the works should be realized, the resolution which is usually brought forward at that stage of public works of this kind, namely, “that the engineer should lay before them his calculation of the remaining sums required.” It is with much regret they have now to communicate that the sums detailed by the engineer, added to the calcula-

tions prepared by the office, of payments not in the engineer's department, amount to a sum exceeding considerably any allowance, which, as all experience proves, must be made for extra payments, and contingencies attendant upon the completion of public works. The total stated jointly by the office and the engineer, the details of which are presented in the appendix to the present report, is as follows :—

Items of account stated by the engineer, for works and contracts amounting to				93,084	18	4
Payments calculated by the office				31,800	0	0
Total				£124,884	18	4

Being informed that some portion of the works in the engineer's estimate may be suspended for the present, and that the sum of 95,000*l.* may be sufficient for the purpose of preparing the line and stations for the opening of the passenger traffic; they recommend to the notice of the proprietors, a resolution by which they should determine that the sum of 70,000*l.* shall be raised by a creation of shares. In creating shares to the amount of 70,000*l.* and in offering to the public the further security arising from the completion and working of the line, the directors believe that the excess above 70,000*l.* may be raised by the issue of the company's bonds. Having on so many occasions called the attention of the proprietors to the advantages which the public will derive from the line of this railway, and from the favourable position of the London station, the directors will content themselves by renewing on this occasion the expression of their unabated confidence in the successful result of the work as an investment of capital. In this undertaking, as in almost every other important line of public communication, whether of canals, turnpike-roads, or railways in England, the surface of which perpetually varies, difficulties, both of engineering and finance, must be encountered, arising out of the inequality of the ground, the cost of the properties occupied, the frequent occurrence of bridges, and the amount and character of the earth-work. The spirit of the proprietors of the Croydon railway, like that exhibited in other contemporary enterprizes of the same kind, has met, and already overcome all the difficulties arising out of the magnitude of the works.

Revised Statement of sums required to complete the Railway.

Mr. Gibbs' estimate	£93,168	13	7			
Ditto ditto of works, which may or may not be executed	2,800	0	0	£.	s.	d.
				95,968	13	7
Retained at New-cross and Sydenham	4,000	0	0			
Certificates on work given, up to 15th December	5,141	13	2			
„ Paid 1,000	3,500	0	0	1,641	13	2
				5,641	13	2
Certificates unpaid, for sundries				3,710	7	3
Retained on certificates for works at stations				2,270	15	6
Carriages, certificate not in				300	0	0
Land on line	7,300	0	0			
Ditto at station	1,350	0	0			
Ditto to Greenwich Railway Company	7,650	0	0			
Ditto	6,000	0	0	22,300	0	0

Sundries, viz.,—solicitors, surveyor, engineer, interest on bonds, office charges, advertisements, &c., &c.				£9,500	0	0
				139,691	9	6
Deduct—Remained to be paid on scrip, 1st January		14,222	10	0		
Balance of cash		1,284	1	2		
		15,506	11	2		
Less—Loan due to Messrs. Jones, Loyd, and Co.		6,000	0	0		
		9,506	11	2		
Bonds not yet issued		5,300	0	0	14,806	11 2
					£124,884	18 4

London, 1st January, 1839.

Extracts from the Engineer, Mr. Gibbs', Report to the Directors.

The cutting at New-cross may not be entirely finished for three weeks to come. The cutting at Forest-hill may not be completed for five or six weeks. The nature of the material through which the upper part of this cutting is carried, is, on the west side, of the most treacherous description, the joints, springs, and land waters, all lie in that direction, but by cutting grips and throwing back the slopes (which is now being done, and which is included in my observations as to the time of completion), I do not entertain any doubt that when completed and grassed over the work will stand perfectly well. On none of the embankments has any alteration taken place, beyond their usual subsidence, and all the slopes of the cuttings stand well throughout the line except that at Forest-wood. The station at Croydon will be finished except in some unimportant details in about three weeks. The works for the repair of engines, &c., at New-cross, I think may be completed in all respects in about five weeks, or less time. Of the station at London-bridge, the foundations are nearly all out and concreted in the part not arched over, two-thirds of the structure up to the level of the Greenwich Railway being erected. At present about one-half of the line is ballasted and one-third of it is permanently laid with the rails. If the rate of working at Forest-hill is increased, as it ought to be, I am certain that the line may be opened for public use in the month of March, or by the middle of April without question, in all its details for passenger traffic, but not entirely ready for the reception of goods. Average price paid on some of the chief descriptions of work on the Railway:—

First—Earthwork.

	Quantity.	Cost.
From Aug. 1836, to Feb. 1837, cube yards,	57,000	
From Feb. 1837, to Feb. 1838, do.	350,615	
From Feb. 1838, to Dec. 1, 1838, do.	972,646	
(The average cost 11½d.)	1,380,261	£ 67,717 0 0
From Dec. 1838, to completion do.	70,000	1s. 6d. 5,250 0 0
Yards	1,450,261	72,967 4 1

General average of the price of all the earthwork, per yard 1s.0½d.

Brickwork.

Mortar.—40,077 yards cost	43,880	4	4
Average price, per yard	1	1	11

Cement.—7,776 yards cost	13,386	1	3
Average price per yard	1	14	5·1

Permanent Way.

Total cost, including Kyanizing the timber . .	54,104	15	0
Average cost for nine miles, per mile . .	6,011	12	9

London, January, 1839.

Summary of the Engineer's Estimate.

	£	s.	d.
Forest-hill contract	5,431	6	4
Sydenham ditto	2,795	0	9
Selhurst ditto	666	0	0
Fencing, and side drains	735	7	6
Permanent-road	22,527	7	4
Wharf	3,152	0	3
Trimming and soiling spoil banks, slopes, &c. .	1,565	0	0
London-bridge station	24,459	18	3
New-cross ditto	9,618	4	1
Brickwork not in contract.	2,433	9	1
Carriages and wagons	7,265	0	0
Engines and tenders	6,800	0	0
Sundries	5,720	0	0
	£93,168	13	7
Other works which it may or may not be advisable to execute	2,800	0	0
	£95,968	13	7

MANCHESTER AND LEEDS RAILWAY.

Special General Meeting held at the Company's Offices, Manchester, Thursday, January 17th, 1839; James Wood, Esq., Chairman of the Directors, in the Chair.

REPORT.—The Directors of the Manchester and Leeds Railway Company are desirous, in the most simple and concise manner in which they are able, to explain the objects specified in the advertisement by which the present meeting has been convened.—The first subject in the notice, in order as well as in importance, is the extension line to connect the Manchester and Leeds, Manchester and Liverpool, and Manchester, Bolton, and Bury Railways. It will leave this company's main line near St. George's Road, passing by the north-easterly side of St. Michael's church, and crossing the river Irk near Ducie-bridge, and terminating at these offices; to which point one of the above-mentioned companies will make a junction, both of them having given the usual Parliamentary notices for effecting the same. The directors think it is not necessary now to enumerate the reasons on account of which they have always regarded—since their attention was turned to it—this junction to be of such importance to the town of Manchester, and likely to be productive of such vast advantages to their proprietary. They have already briefly given their views in their last report, and now will

merely state, that every day which has since elapsed has confirmed their former opinions upon the subject. They are glad also to be able to state, that their negotiations with the Liverpool and Manchester Railway company have been based upon the principle of its importance to them, as well as to this company, and of their entire approval of the site which is adopted for a station. The next point in order is the diversion of the river Calder. The undertakers of this navigation having made a new and direct cut, to relieve themselves from its serpentine and tortuous course, (as is illustrated by the plan now before the meeting,) the directors wish to avail themselves of this circumstance to relieve the company from the necessity of erecting two expensive bridges. With respect to the two branches to Halifax and Oldham, for which the shareholders have already given their sanction, the object in introducing them into the present notice, is merely in compliance with a matter of form. The last particular which requires any additional information from the directors to the shareholders affects the capital of the company. It is intended to raise 650,000*l.*, by the creation of 13,000 half-shares, to be distributed amongst the holders of the company's stock, in the proportion of one new half-share to every original share. With respect to the appropriation of this additional capital, the shareholders have only to recollect, that they have been informed that the first capital raised by the company was mainly for the purchase of the land, and making of the line; and that it would be necessary, at a future time, to apply to Parliament for further powers, viz. to work the line as carriers; a large outlay, will, therefore, be required for engines, carriages, trucks, stations, &c. &c., considerable engagements for which have been already entered into by the company, to enable them to open their first portion of the line in the month of May. The other part of the required capital will be appropriated in making the proposed junction and the two branch lines.—In conclusion, the directors have the pleasure of informing their friends, that, owing to the satisfactory manner in which the calls have been paid up, and the amount to which the loans taken up by the company have already arrived, they hope to be relieved from the necessity of making any further calls upon the holders of old shares for several months to come.

GREAT NORTH JUNCTION RAILWAY,

Or Inland line of Railway from Newcastle-upon-Tyne to Edinburgh.

To the directors of the Newcastle-upon-Tyne and Carlisle Railway.

GENTLEMEN,—I have examined the country and taken levels, in order to ascertain the best route for a line of railway from Newcastle to Edinburgh and Glasgow, agreeably to your instructions, and beg leave to present the following report. It will not be necessary for me to enter into a prolix description of the course of the line I recommend, and the levels, as the map and sections which accompany this will, for the present, sufficiently point out its general direction and gradients. From Newcastle the line proceeds for nearly 21 miles upon the Newcastle and Carlisle Railway, to the west of Hexham, (the average gradient on this part of the line being 12 feet per mile,) from whence it follows the vale of the North Tyne for 37 miles, with gradients varying from 14 to 20 feet per mile, the average being 17 feet per mile, to the head of the North Tyne, where the ridge of hills will be passed by a tunnel of 1½ mile in length, under a point called Note of the Gate, which is the summit at this part of the ridge, the strata of which consists mostly of clay slate and part gray wackie, the latter not being of a dense character

and the whole favourable for tunneling. After leaving the tunnel the line enters the vale of the Rule Water, and runs along the west banks of it, between the high and low ground for 10 miles, when it commences curving gently to the north-west, keeping to the south of Denholm, and thence to the Teviot river, which it crosses near Teviot bank, 4 miles east from Hawick; at this point the valley is only about 300 yards wide; from the tunnel at Note of the Gate to the Teviot, a distance of 13 miles, the inclination northwards will be 26 feet per mile. From the Teviot the line proceeds in nearly a straight line to Eildon, where it winds easily to the north-west and passes close to Melrose, thence to the Tweed at Abbotsford. From the Teviot to the Tweed the distance is 13 miles; 9 miles of which will be level, the remainder being at an inclination of 10 feet per mile. From the proposed crossing of the Tweed at Abbotsford, a line to Glasgow might diverge, and the shortest line to Edinburgh, and that which possesses the easiest gradients, would continue on by Galashiels up the Gala Water vale, for a distance of $14\frac{1}{2}$ miles, to a summit near Crichton Moss; about 9 miles of this distance is at an inclination of 24 feet per mile, the remainder $4\frac{1}{2}$ miles rising 30 feet per mile. From Crichton Moss the line descends to Edinburgh, a distance of 18 miles, for about 9 miles at the rate of 30 feet per mile, and 26 feet per mile for the remainder. The precise situation for the terminus at Edinburgh remains to be settled; a very good point can be got at, south of Bruntsfield Place, from whence a junction may be formed with the depôt of the Edinburgh and Glasgow Railway, if wished for.

From the Tweed to Abbotsford, another line to Edinburgh, by Peebles and the Eddlestone Water, has been tried by levels, which although very favourable as far as Peebles and for several miles up the Eddlestone Water, is a worse line afterwards in most respects to Edinburgh, having to pass over a higher summit; it will also increase the distance to Edinburgh 9 miles.

A line to Glasgow might, as before stated, leave the Edinburgh line near Abbotsford and continue up the vale of the Tweed, passing close to Inverleithen and Peebles, thence near to Biggar, to the south of Lanark, and near to Hamilton, on to Glasgow, a distance of $68\frac{1}{2}$ miles from the junction with the Edinburgh line near Abbotsford. I have not as yet completed the levels of this part of the line to Glasgow further west than Peebles, but the portion from Abbotsford to Peebles, a distance of 17 miles, is very favourable, rising at the rate of 10 feet per mile, and from the nature of the country, and from information that may be relied upon, I have no doubt but that a very good line may be obtained for the remainder of the distance to Glasgow, and that the gradients will not exceed 16 or 18 feet per mile. But as a line of railway is now being made between Edinburgh and Glasgow, a distance of 46 miles, the line I have described up the Tweed from Abbotsford to Glasgow may be rendered less necessary for the present.

The length of new railway to make between Hexham and Edinburgh will be 96 miles, and $20\frac{1}{2}$ miles being already made between Newcastle and Hexham, will make the distance between Newcastle and Edinburgh $116\frac{1}{2}$, and if a line up the Tweed to Glasgow should be considered desirable, $68\frac{1}{2}$ miles more of railway will be required, making by this route the distance from Newcastle to Glasgow 152 miles.

From what I have stated respecting the gradients, it will be seen that the average between Newcastle and Edinburgh may be 18 feet per mile. It will also be perceived that the deepest gradients are only 30 feet per mile, in one part for 9 miles in length, and in another part $4\frac{1}{2}$ miles in length, and these are in the most advantageous positions they could well be placed, viz.: on each side of a summit, from which heavy traffic will descend both ways.

The greater part of the work to be done is of an easy description, and what may be called the heavy works (and some there are on all lines of so great an extent) present no extraordinary or insuperable difficulties; suitable materials for the works are found on all parts of the line, and almost all the landholders are not only favourable to, but would give it their best assistance. The line upon the whole may be executed at a moderate cost per mile.

With regard to the traffic that may be calculated upon, the item of passengers, as is the case with all other railways, will no doubt be great. On those parts of the line not thickly populated, the carriage of minerals will be the greatest, and the additional inducement to work, and the greater demand for those minerals, given by the facilities of railway communication, will cause a great increase of population and of tonnage of all descriptions. The North Tyne district especially abounds in valuable minerals. Here there is one of the finest deposits of iron-stone in the kingdom, extending over many square miles on both sides of the line. This mineral is now being worked in several places; one considerable tract of it in particular, which has lately been let by his Grace the Duke of Northumberland on very liberal terms. There are extensive and valuable seams of coal of good quality, a great part of it, particularly that near the head of the North Tyne, is also his Grace's property, large quantities of which will be conveyed both ways on the line, and for many miles into Scotland, for the supply of those places to which coal is now carted at a heavy expense from distances of 12 to 24 miles. I allude to the neighbourhoods of Hawick, Jedburgh, Kelso, and most parts of Roxburgh and Selkirkshire.

The same observations will apply to lime for agricultural and other purposes, as there is abundance of limestone on this part of the line. Lead ore is also worked here and good freestone. After leaving the North Tyne there is no coal found on the line to Edinburgh, until within 8 or 9 miles from Edinburgh, to which place it would be conveyed, as well as southward, to the thriving manufacturing town of Galashiels and district around it, which is now subjected to the heavy expense of 24 miles cartage for coal. Lime for this district is also in great demand.

The conveyance of sheep, cattle, and all kinds of agricultural produce to the markets of Glasgow, Edinburgh, and Newcastle, and the smaller towns on the line, would bring in a considerable revenue. The carriage of manufactured goods, raw materials, groceries, and various other articles, to and from the manufacturing districts on the line of the railway, will be very great.

As desired by you I will endeavour to enter into a few points of comparison between the line now before you, and the other two lines that have been projected from Newcastle, and for that purpose it will be necessary for me to advert to the published reports on those lines. A line of railway from Newcastle to Edinburgh and Glasgow, called the Midland Line, having been recently reported upon, and partly levelled by Mr. Joshua Richardson, it is necessary for me to observe that the line now before you, although it was certainly adverted to in favourable terms by Mr. Richardson, differs for nearly 80 miles of its length, from that laid down on a map by him, particularly in that part about 36 miles in length, the only part which he had levelled, or of which he has published a section, and which line has drawn such strong animadversions from Mr. George Stephenson in a report upon a line by the East Coast. Mr. Stephenson's principal objections to Mr. Richardson's line appear to bear upon a "Tunnel under the Carter Ridge, an embankment in crossing the river Jed seven furlongs in length, and 210 feet deep at the highest point, an embankment over the Teviot river 1 mile in length, and averaging 146 feet deep; and Mr. Stephenson

observes the inclinations obtained by these immense works are not less than 30 and up to 45 feet per mile; and he goes on to say, he thinks he is perfectly justified in stating that in order to attain suitable levels for locomotive engines, it will be necessary to have a tunnel 8 or 9 miles in length." Leaving Mr. Stephenson and Mr. Richardson to settle their difference of opinion about the 8 mile tunnel, I will merely draw your attention to the fact that the line I have now the honour of recommending to your notice, is not liable to any of the above objections started by Mr. Stephenson, as the tunnel is only $1\frac{1}{4}$ mile in length, the river Jed is not crossed at all, and the crossing of the Teviot is only 300 yards long, and the gradients obtained by these works are 20 feet per mile in one part, and 24 feet per mile on the other part of this district, which it is scarcely necessary to add are very favourable inclinations for the use of locomotive engines, as, indeed, are the whole of the inclinations on the line; and it is worthy of notice that most of the minerals and other heavy articles will be carried down the inclinations. Judging from Mr. Stephenson's report on a line to Edinburgh by the East coast, it is probable that some of the inclinations may be easier than those of the line now under your consideration; but this sole, and in this case inconsiderable advantage, is much more than counterbalanced by the greater facilities that will be afforded to the commerce of the country by the inland line, by the greater emoluments that will accrue to the promoters, and by the more numerous benefits that will be conferred upon the nation at large, and particularly to the southern counties of Scotland, and the towns of Glasgow, Edinburgh, and Newcastle-upon-Tyne; and a junction may be effected with the Great North of England Railway, the Brandling Junction, and others south and east of Newcastle, with much greater ease, and considerably less expense, than with the proposed East Coast Line. The East Coast Line running parallel with, and near to the sea, can have scarcely any coals and other minerals or goods carried upon it; the steam-boats and other vessels will be formidable rivals in the conveyance of passengers and merchandise to the intermediate places, so that there would be nothing for it to carry but a small remnant of traffic on short distances, and some through passengers. Indeed, by the East Coast Line, the interior of the country could only be benefited by the making of numerous branches, amounting in length to nearly the same number of miles as the main line itself; but even then the minerals and merchandise when arrived at the coast, would be sent to their destinations by the cheaper mode of carriage afforded by the sea; in fact, the making of the various branches would be a more profitable speculation than the would-be parent line, for they would be nearly independent of it, receiving no benefit from it, and yielding none.

Mr. Stephenson's report supplies me with instances in corroboration of the above assertions. He says—"It (meaning his coast line) will be a great advantage to the valley of the Tweed, inasmuch as they will procure both lime and coal from Berwick at a cheap rate, and as that river is crossed at the height of 90 feet you will be enabled to have a level branch along the valley for many miles." The valley of the Tweed would certainly be benefited by a branch line up the Tweed side, but this branch, of many miles, must be made at an additional cost, and as the coal and lime is obtained in the immediate neighbourhood of Berwick, not one ton of it need travel on the main line. How then can the main line be benefited by it? By the Tweed branch, also, the produce of the interior will be brought to the markets at Berwick, and the surplus shipped for other ports, as is now done, but how can this traffic benefit the East Coast Line, not having any occasion to travel upon it?

The same remarks are applicable also to the branches which Mr. Stephenson proposes to run up the valleys of the Blyth, the Wansbeck, the Coquet, and others. All these branches must be made at an additional cost, and when made will be of little benefit to the East Coast Line; and the greater part of their produce will be shipped as in the case of the Tweed Branch to Berwick.

I am not able at present to say much on the subject of the comparative cost of the East Coast and Inland Lines to Edinburgh, but, for the following reasons, I think that the route I have proposed to Edinburgh will require much less capital to be raised and less annual expenditure for maintenance than the East Coast Line.

In the first place, as before stated, there is nearly twenty-one miles less of new railway to make, and secondly, in order to connect the railways now forming from the south and east of Newcastle, viz., the Great North of England and the Brandling Junction Railways, with a depot on the Town Moor, north of Newcastle, as proposed by Mr. Stephenson, an additional line must be made by part cutting and part tunneling for above a mile through the town of Newcastle; this of itself would be a most costly work, and from the great and daily increasing value of the property that would be injured, and the improvements now going on that would be interfered with, it would be objected to by numerous parties, and thus a most formidable barrier is presented to the project of an unbroken line of communication with the southern railways. But, by effecting a junction with the Newcastle and Carlisle Railway on the north bank of the Tyne, which may easily be accomplished by a bridge to suit all parties, the enormous and useless expense of getting through the town will be avoided, as well as the cost of establishing another depot on the Town Moor, than which a worse situation could not well be fixed upon, or, if it should not be convenient to the promoters of the undertaking to incur the expense of a bridge across the Tyne in the first instance, a union may be formed by the Great North of England Railway and the Brandling Junction Railway, with the branch of the Newcastle and Carlisle Railway now in operation on the south side of the Tyne.

By the means I have pointed out, the public convenience and benefit, and the objects of all parties interested in railways now made, or in course of formation, will be fully answered; but it must be evident that, except with the view of promoting an inland line, the Newcastle and Carlisle Railway Company can have no interest whatever in aiding or joining in the bridges and depot schemes reported upon by Mr. Geo. Stephenson, and submitted to you in November last. I have the honour to be, Gentlemen,

Your most obedient servant,

JOHN BLACKMORE.

Newcastle-on-Tyne, December, 1838.

BOLTON AND PRESTON RAILWAY.

Half-Yearly General Meeting, held at Bolton, Thursday, the 31st day of January, 1839; THOS. RIDGWAY, Esq., in the chair.

REPORT.—The committee have now to report that they have let the contract for the formation of the first three miles of the railway, including all the bridges and masonry through the town of Bolton, upon terms which they deem reasonable, to a gentleman who has had practical experience in similar works, and whose responsibility, as well as that of his sureties, is satisfactory to the committee. The progress already made by him in the execution of the works, considering the shortness of the period which has elapsed since he broke ground, gives good earnest of his intention to

prosecute them with energy. This portion of the line (by far the most troublesome both to plan and to execute) will be completed in the course of next year.

The whole of the land and premises required for this part of the line, with a trifling exception, including a sufficient quantity of land in Bolton to accommodate an extensive business in passengers, merchandise, and coal, has been purchased or agreed for, and the committee trust that the terms on which the property has been acquired, will, on the whole, be deemed satisfactory by the company. Two cases had been agreed to be left to reference, while the first Bill was before Parliament, two others were subsequently referred, and in one instance only was recourse ultimately had to a jury, though in no case was an unreasonable demand submitted to, and in many cases the committee succeeded in very materially reducing the claims made.

The amount agreed to be paid to the North Union Railway Company for the premises purchased from them at Preston, has been paid, and the conveyance to this company duly executed.

Some months ago the committee assumed the charge of the tram-road, and the management thereof is now exclusively in the hands of this company. In the first quarter of the year, the tonnage arising from the tram-road and the south level of the Lancaster canal, was of course very materially diminished by reason of the intense frost, which entirely closed the canal for one half of the quarter, but from that period to the close of the year, the traffic has been very satisfactory, having amounted, in the course of the year, to about 180,000 tons of coals and merchandise, yielding a gross income of nearly 10,000*l.*, and a net profit to this company of about 1,000*l.*, after meeting the rent to the Canal Company, and all disbursements.

The committee have obtained from the Lancaster Canal Company a further abatement from the rent agreed to be paid to them, of 400*l.* per annum (in addition to the 600*l.* noticed in the report of Oct. 1837), in consideration of the prejudice which may possibly result to this company through the facility of connexion acquired by the North Union Railway Company with the north level of the Lancaster canal at Preston, such connexion not having been contemplated at the time of the original arrangement with the Canal Company. This reduction of rent will come into operation as soon as a communication shall have been formed between the North Union Railway and the canal; and from that period the rent to be paid to the Canal Company will be 7,000*l.*, instead of 8,000*l.* as originally agreed for.

Your committee have observed with satisfaction the application now making to Parliament, conjointly by the Liverpool and Manchester, the Manchester and Bolton, and the Leeds and Manchester Railway companies, for powers to make a branch line which will have the effect of connecting the three railways at Manchester. The advantages likely to result to the Bolton and Preston Railway from a junction with these various railways, are too obvious to require comment.

In consequence of Mr. Edward Bolling having vacated his seat as a director, the committee unanimously elected Mr. John Cross in his stead. The committee have also determined, by ballot, the names of five gentlemen who now retire from the direction according to the Act of Incorporation, but who are eligible to be re-elected, should the proprietors think proper to re-appoint them, or any of them, viz.:—Stephen Blair, Esq.; Benjamin Dobson, Esq.; Peter Rothwell, Esq.; James Hardcastle, Esq.; W. H. Hutchinson, Esq.

The committee beg to annex an account showing the whole of the

BOLTON AND PRESTON RAILWAY.

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receipts and expenditure of the company from the commencement of the undertaking to the end of the past year, and also an account of the income and expenditure upon the tram-road and canal to the same period.

RECEIPTS.

1838. Dec. 31.	£.	s.	d.
To amount received on account of shares	30,480	0	0
To interest paid on calls in arrear, and do. allowed by bankers	468	10	8
To less bankers' commission 70 <i>l.</i> 7 <i>s.</i> 2 <i>d.</i> , interest to sundries, 246 <i>l.</i> 7 <i>s.</i> 0 <i>d.</i>	316	14	2
		151	16 6
	£30,631	16	6

DISBURSEMENTS.

1838. Dec. 31.	£.	s.	d.
By amount paid on account of the expense of obtaining the two Acts of Parliament (There are further sums due under this head, amounting to about 3,340 <i>l.</i>)	13,628	8	7½
By law expenses (jury cases, conveyances including valuations and references as to land)	111	1	2
By engineering and surveying expenses	228	0	1½
By directors for attendance at committee meetings and on deputations	162	15	0
By salaries, secretary and clerks	180	5	0
By travelling and other expenses of directors, secretary, and clerks	90	12	8
By office expenses, printing, advertising, stationery, postages, and sundries	225	18	2
By land, buildings, and compensation 7,266	18	6	
By less cash received for building materials sold 760	9	8	
	6,506	8	10
By works	456	8	0
By tram-road disbursements	61	19	10
	21,651	17	5
By balance in bankers' hands	£8,979	19	1

Abstract of the Income and Expenditure upon the Tram-road and South Level of the Lancaster Canal, from 1st January to 31st December, 1838.

1838.	£.	s.	d.
June 30. To one quarter's rent to Canal Company to 31st March, at 7,400 <i>l.</i>	1,850	0	0
Sept. 30. Do. to 30th June	1,850	0	0
Dec. 31. Do. to 30th Sept.	1,850	0	0
Do. to 31st Dec. (payable 31st March next)	1,850	0	0
	7,400	0	0

Disbursements upon the tram-road.

Expenses of stationary engine, and inclined plane, consisting

of	£.	s.	d.	
Fuel	238	3	0	
Oil	58	4	6	
Repairs	15	2	10	
Chain	63	5	4	
Engineer and two assistants	109	14	0	
	<hr/>			484 9 8
Cast-iron rails, nails, carriage, &c.	469	3	8	
Timber for bridge, &c.	187	15	10	
Clerk and assistant at weighing-machine	68	11	0	
Labour upon the road	209	0	5	
Rates 8 <i>l.</i> 9 <i>s.</i> 9 <i>d.</i> , rent 8 <i>l.</i> 1 <i>s.</i> 6 <i>d.</i>	16	11	3	
	<hr/>			1,435 11 10
Interest upon balances due to Canal Company	21	9	2	
Balance in favour of the B. and P. Company	955	4	11	
	<hr/>			£9,812 5 11

1838.

1838.	£.	s.	d.
June 30. By amount received for tonnage accruing between 1st January and 31st March (the canal having been stopped by frost for seven weeks out of the quarter)	1,361	2	11
Sept. 30. Do. Do. for tonnage to 30th June	2,636	1	6
Dec. 31. Do. " to 30th Sept.	2,486	14	7
Rent of cottage	8	0	0
Amount due for tonnage to 31st Dec. (receivable within the next quarter)	3,320	6	11
	£9,812	5	11

THOS. RIDGWAY, *Chairman.*

HULL AND SELBY RAILWAY.

The General Meeting held at Hull, Feb. 1st, 1839, H. BROADWAY, Esq.,
M.P., in the chair.

THE directors have great pleasure in again meeting the proprietors of the Hull and Selby Railway, and in laying before them an outline of their proceedings during the past year.

The remainder of the land required for the line of railway, which had not been purchased when the last general meeting was held, was agreed for shortly afterwards, as were some small portions required for approaches to bridges; and the directors have the satisfaction of stating that in this department little remains to be done, the greatest part of the land having been paid for and conveyed to the company. In the cases of disputed title to the foreshore of the Humber, the valuations fixed by juries, or otherwise, were paid into the Court of Exchequer, and with the exception of that of the corporation, where an ancient title to the *growths* was proved, no decision has been come to relative to the title; but it is expected that in a short time the other parties claiming will apply to the Court for a hearing, when a speedy decision of the question may be anticipated.

In order to facilitate the transfers of shares by proprietors residing at a

distance, the directors made arrangements with Mr. Ivie H. M'Rae, of 28, Tokenhouse-yard, to act as the company's agent in London, and with Messrs. Thos. Cardwell and Sons, as their agents in Manchester. By both these parties transfers are received and forwarded, and other necessary business transacted.

Mr. Rhodes, the arbitrator to whom the question of an opening or a fixed bridge over the river Derwent was left, has decided that an opening bridge is not indispensable, and that the railway company shall pay the sum of 160*l.* towards the improvement of the river, in its neighbourhood, and the repairs of Loftstone bridge.

After this decision, the directors lost no time in advertising for tenders for the bridge, and also for the formation of the line from the junction with the Leeds and Selby Railway at Selby, to the river Derwent, a distance of about six miles, and from Melton to the east end of the Market Weighton embankment, a portion of the line of a similar length; the Selby contract, including the foundations of the Derwent bridge, was taken by Mr. Charles Briggs, who is also the contractor for the foundations of the bridge over the river Ouse; the Brough contract by Messrs. Pratt and Fenton, who are also contractors for other works with the company, and the iron superstructure of the Derwent bridge by Messrs. Thomas S. Pim and Co., of Hull; and the directors consider that all these contracts are made on fair and reasonable terms.

An agreement was entered into early in the spring with Mr. Charles Faviell, for making the embankment on the foreshore near Hull, but the progress made by him with the work was so slow and unsatisfactory, that it was mutually agreed to cancel it in the month of July. A contract was immediately made with Messrs. Townshend and Harker, who have taken the works of the Hesse contract, and they made the necessary preparations for commencing operations. Some time was inevitably lost by this circumstance; it is, however, expected, from the progress which has since been made, that the works of the Hull contract, extending from Hull to Dairycoates, will be amongst the first completed; and the work, so far as it has been done, has given satisfaction.

In the month of April, an agreement was made with Messrs. Fenton, Murray, and Co., of Leeds, to furnish six six-wheeled locomotive engines of the very best description; they are now in a great state of forwardness, and will be ready for delivery when required. The directors were anxious to have a portion of their engines in readiness sufficiently early, having witnessed the great loss and inconvenience experienced by other companies, in consequence of neglecting to attend to this important part of their proceedings, and the conditional arrangements made for a further number will place this company in a position to commence business under the most advantageous circumstances when the line is ready.

As there appeared, from the information which the directors had obtained, a great possibility that the price of iron would advance, they considered it prudent to enter into further contracts for rails, and, in addition to 2,000 tons which were engaged at the time the last report was made, the directors have agreed with the Rhymney Iron Company, Messrs. Guest, Lewis, and Co., and Messrs. Crawshaw and Co., for a further quantity of 3,000 tons, upon very reasonable terms, making 5,000 tons in the whole; it is expected that a few hundred tons more will be all that will be required for the whole line, with the necessary sidings; the directors have also contracted for a portion of the iron chairs.

The manner of forming the permanent way was a subject which long engaged the most anxious attention of the directors and their engineers, who

were desirous in this, as in all other matters connected with the undertaking, to avoid all additional expense, unless some corresponding advantages were to be gained; and at the same time they felt it to be an imperative duty to examine carefully various plans adopted by other companies where railways were already in operation, and as far as possible to benefit by their experience; and the directors have now to state, that Messrs. Walker and Burges, the company's chief engineers, after giving the question in all its bearings their best consideration, have recommended that the rails should be laid partly upon longitudinal bearings of Baltic timber, twelve inches wide by six inches in depth, connected by cross sleepers, and partly upon cross sleepers only; in accordance with this determination, about two-thirds of the line will be laid upon longitudinal bearers, and the remaining one-third upon cross sleepers; and in order to carry out this plan, the directors have already contracted for 4,000 loads of timber, and 70,000 cross sleepers.

As the expense of sawing so large a quantity of timber will be very considerable, and a steam-engine will be required for the machinery of the workshops at the Hull terminus, the directors have determined also to order forthwith an engine of ten-horse power, which may be rendered available for this purpose, as well as all others for which it may be required, and have contracted with Messrs. Brereton and Vernon, of Hull, for one of the best description, which is now making, and to it the saws, &c., which are necessary, will be appended.

The plan of Kyanizing wood in order to its preservation has become so general, and the testimonies in its favour are so numerous, that the directors would have thought they neglected the interests of the company had they not adopted it both for the longitudinal bearers and cross sleepers; they have therefore entered into a contract with Messrs. Barrett and Son for the necessary tanks, one of which is to be in readiness by the middle of April; and as some of the sleepers will be previously delivered, they will then be enabled to commence Kyanizing them.

A Bill for regulating the conveyance of mails by railways was introduced into Parliament during the late session, and the attention of the directors was called to it by a circular received from one of the principal companies in London. Several of the clauses in this Bill were so very unreasonable, and bore so hard upon railway companies, that they determined to oppose the objectionable clauses to the utmost of their power. Many of the companies sent deputations to London, to act as the emergency might require, and the chairman of this board being at that time in town, he was requested to attend the meetings of the delegates, on behalf of the company; the opposition thus established was successful, and the Bill was ultimately much modified.

For the purpose of facilitating the ballasting of the line of railway between Selby and the river Derwent, the directors have entered into a contract with the directors of the Leeds and Selby railway for a considerable quantity of stone suitable for the purpose, which will be conveyed by that railway to Selby; this arrangement will not only effect a considerable saving in the cost of the ballasting, but, which is of equal importance, greatly assist in the early completion of the work.

In making arrangements for the opening of the railway, the directors have to inform you that they agreed with Messrs. Hustwick and Bean to construct ten first-class and twenty second-class carriages for passengers, the materials and workmanship of which are to be of the best kind, and from their established character it is anticipated that they will prove to be of a very superior description; several of them are in a great state of forward-

ness, and in a very short time it is intended to contract for the carriages and trucks required for the conveyance of goods, cattle, &c., patterns of which are now being made.

The directors might state a variety of other matters which have engaged their attention since the last general meeting, but although they are important in themselves, as they are not necessary to enable you to understand the position in which you are placed, they do not consider themselves justified in trespassing on your time by minutely detailing them; they think sufficient has been stated to convince you that every possible attention has been paid to the interests of the company in all departments, and they now, to make you more fully acquainted with the present state of the undertaking, beg to lay before you the following

REPORT OF THE ENGINEERS.

To the Chairman and Directors of the Hull and Selby Railway Company.

Gentlemen,—This report, being immediately before an annual meeting of the company, may be expected to be general; and to give an outline of the state of the railway works in the engineering department, even at the risk of repeating part of the substance of your report to the proprietors.

One of the most frequent causes of delay upon railway works arises from the not having possession of the whole of the ground; this, we cannot now complain of, nearly every yard of the thirty-one miles being in possession of the contractors; and what is equally important, every work along the whole line being let and in progress, with the exception of laying the permanent way.

The superintendence of the works is divided into four lengths, and we have reason to report favourably of the general zeal and conduct of Messrs. Lynde, Bray, John Timperley, jun., and Fletcher, the superintendents, whom you have appointed under our recommendation.

Beginning at the Hull end, the foreshore works are now let to Messrs. Townshend and Harker. From the time spent, after it was found necessary to take the works out of the hands of Mr. Faviell, in reletting them to Messrs. Townshend and Harker, and these contractors collecting implements and materials, this work did not fairly commence until the end of July; of the whole length, viz., about 1,700 yards, 700 yards at the west end are nearly completed—200 yards towards the east end nearly ready to receive the stoning—other 200 yards are in progress, and 600 yards in the middle are not yet begun. So far as it has been done, we have every reason to report favourably of the work; and our opinion is, that the mode of forming the embankment will be quite efficient. We have no doubt of the whole being completed in the course of the ensuing summer.

From the Humber Bank to Melton, $7\frac{1}{2}$ miles in length, is let to the same contractors. Beginning from the east end, $3\frac{1}{4}$ miles, to Hessle, are embanked, the ditches and culverts made, and the whole nearly ready for receiving the ballast. The bridge over Hessle harbour is built, and two of the road bridges nearly finished. At Hessle is the deepest cutting upon the whole line; since March, when this was begun, 100,000 yards have been removed to form the embankments, leaving about 130,000 yards to remove; the greater proportion of the above is rock and gravel, which will be applied to ballast the line, and will not, therefore, be removed until the cuttings and embankments generally are complete. The materials from this hill have been very useful in the formation of the Hull foreshore embankment. Twelve viaducts or bridges between Hessle Hill and Ferriby, together with the culverts, are formed; two cattle archways and one accommodation bridge remain to be built. We expect that in about four months the embankment from Hessle to Ferriby, two to three miles in length, will be

completed. The Ferriby cutting, which is the deepest after Hessele, will, at the present rate, be done in six months from this time. A bridge at Melton, which comes within this contract, is finished: only one occupation bridge remains to be built.

The next contract, $6\frac{1}{2}$ miles in length, extending from Melton to the east end of the Market-Weighton Canal embankment, let to Messrs. Pratt and Fenton, was begun in October last; already $3\frac{1}{2}$ miles at the western end are formed ready for the ballasting; of the remainder of the length, three-quarters of a mile is formed, and, with ordinary expedition, the excavation in the other two miles will be done by Midsummer; the material from this excavation will form the embankment to the bridge upon the Brough road.

A large quantity of ballast has been dug from the fields near Brough, which will be applied conveniently for this contract. This ballast, as well as the hard stone for the facing of the Humber embankment, has been found upon the estate of Captain Shaw, from whom, it is proper to say, every accommodation has been received upon terms which Mr. Earnshaw considers liberal and equitable. This contract includes several culverts, of which seven are built, and the Brough bridge, which is *yet* to build.

The next contract comprehends the Market-Weighton Canal embankments, $1\frac{1}{2}$ mile long. This was the first length that was let to Mr. Pratt; it was begun in the autumn of 1837, and may be now considered ready for the ballast. The contract comprehends five culverts, which are built; also the bridge over the Market-Weighton Canal, with the exception of the iron-work of the arch, which was let to Marshall and Co., of Derby. The bridge, including the arch, is nearly complete.

Proceeding westward, the contract next in order, extends from the Market-Weighton embankment to the river Derwent, a length of nine miles—Mr. Charles Faviell, contractor. The whole of this, excepting half-a-mile toward the *east* end, is ready for the ballast. In this half-mile is situated the warping drain, directed by the Act to be built for Messrs. Weddall; this has caused some delay, which we hope and trust is now at an end. The ballasting of this contract has been begun at the west or Derwent end; but only half-a-mile is done. We are pressing the contractor to use much greater expedition, which is required on his part, to complete the ballasting within his contract time, say the end of this year. Considerable progress has been made in the bridges upon this contract, all of which may easily be finished in the course of the summer. Nearly all the culverts are built.

The next contract, let to Mr. Briggs, includes the works of the bridge over the Derwent, excepting the iron-arch, and the forming of the line to the river Ouse, a length of six miles. The western abutment is founded and raised above high water; the eastern abutment is not begun. For about two miles the embankments are partly raised from the side ditches and about three-quarters of a mile of the cutting done. As the contractor has now rails to enable him to proceed with expedition, the whole length may be expected to be ready for the ballasting by Midsummer. Several of the culverts are made; the diversion of the York road, near Selby, is formed, and the stoning commenced.

The iron-work of the bridge over the Derwent was delayed through the difficulty in obtaining a settlement as to whether the bridge might be a fixed arch, which is now fortunately determined, and the iron-arch is being cast by Messrs. Pim and Co. of Hull.

The foundations for the bridge over the river Ouse (which is the most difficult of all our works) are got in by Mr. Briggs, and now ready for the iron superstructure, which is making at the Butterley iron-works. The standards or pillars are cast, and a letter from the iron-works, received

yesterday, informs Mr. Briggs that a part of the castings were shipped, and on their way to Selby. Expedition with the works of this bridge, so that it may be completed in the shortest possible time, is important not only as respects the opening of the railway, but to enable Mr. Briggs to take ballasting across from Milford to the eastern end of his contract.

The fencing of the line is proceeding rapidly, and Mr. Earnshaw, with whom the agreements are made, informs us that the whole may be completed before Midsummer next, which will prevent any damage to the adjoining crops during the present year.

The abstract of the above details is, that about twenty miles out of thirty-one are ready for the ballasting, which should in some places be kept back that the forming might have the advantage of consolidation during the winter; this cause will not, however, be of much longer duration, and early in the spring the ballasting may be proceeded in with great expedition.

Considerable pains have been taken with designs for the Hull depot—workshops, &c., to which you have so frequently directed our attention. These will be begun early in the spring, upon a plan which will, we hope, be found consistent with economy and convenience at the same time.

The last, and not least important point, is that of *cost*. We believe that your report to the proprietors will inform them the probability of all, or nearly all, the money you are enabled to raise under the Act being likely to be required; and it may be asked if this arises from the insufficiency of the original estimate, which we made in round numbers 400,000*l*. The reply is, partly so—arising from the increase of labour in the department of railway making, but that only a small part of the additional sum is to be ascribed to this; we believe that twenty or twenty-five thousand pounds would cover it. The difference beyond this may be accounted for as follows:—

Compensations have been made to Mr. Raikes and others to save the Bill in Parliament, and since, in excess of what was calculated; these are about 25,000*l*.

At the Hull end, you have purchased a large space of ground, beyond what Mr. Tadman estimated. As we believe that this property is likely to increase in value, we think the measure very advisable; but this, with sixty-nine acres along the line, which will be disposable, and the excess of the foreshore purchases, increase the immediate outlay about 23,000*l*.

When the Bill was before Parliament, warping drains, and other works for the accommodation of individuals, were pressed upon you, and agreed to then and since; these will amount to 7,000*l*.

A clause in the Act which threw certain legal expenses upon the company, which formerly were paid by the venders of property, adds to the company's charge 3,000*l*.

The increasing trade of Hull, and the increasing importance of a railway, which, though not conspicuous in the railway market, or even publicly, is to connect Hull and the north-east of Europe with the Atlantic, and London and the north of England, have induced you to adopt a heavier weight of rails, and a more expensive mode of laying them, which will add to the outlay about 25,000*l*.

And you propose, also, to increase the number of engines, carriages, and wagons, workshops and offices, for which will be required about 20,000*l*.

In conclusion, we are glad to be able to say that, in the whole length of the varied works, there is no failure at all worth notice, nor any indication of weakness or insufficiency in any part; and, with a full season before us, and every thing ready for full work, we hope and trust that, with the exception of, perhaps, a portion of the permanent way, very little of

anything in the engineer's department will be unfinished at the close of 1839. We are, Gentlemen, your very obedient servants,

WALKER & BURGESS, JOHN TIMPERLEY.

Hull, Jan. 30, 1839.

From the statement of the cash account, which will be presented, it will appear that the directors have been anxious not to make unnecessary calls upon the proprietors; with every wish, however, to make the payments as easy as possible, it is evident that, as the works are to be vigorously prosecuted, a constant and considerable outlay is necessary, and this they feel convinced will be found most conducive to the interests of the proprietors, because, the earlier the railway is completed, the sooner the proprietors may expect a return for their capital; and the directors confidently hope that the railway will be in readiness to be opened in the spring of 1840, as originally proposed;—to accomplish this no efforts will be wanting. During the past year the directors have made two calls only of 5*l.* each, one payable on the 16th April, the other on the 17th September; and so well have the calls been responded to, that, out of 160,000*l.*, the amount of the four calls, only 9,143*l.* remains unpaid, of which sum a considerable portion they expect will be shortly received. Considerable delay and trouble have been occasioned by parties who purchased scrip certificates neglecting to register the shares, which rendered application necessary to the original proprietors; but the conciliatory measures adopted, and the explanations which were given, have, in nearly every case, eventually had the desired effect, the beneficial result of which will be at once seen.

From the statements which have been already made, and the information given in former reports, you will be prepared to expect that the railway will not be completed without a larger expenditure than was originally contemplated; and although this has almost been universally the case in the construction of other railways, the directors were very desirous to have kept the outlay within the amount of the capital of the company, had it been possible to do so; the excess, though considerable, will be much less in proportion than that of railway companies in general, and they feel satisfied that when the shareholders consider the circumstances in which the company have been placed; the heavy and unexpected claims for compensation which have been made upon them; and the increased outlay consequent upon the improved mode in which it is proposed to lay the permanent way, they will find abundant reason for this excess.

They refer particularly to the compensations to Mr. Raikes and other gentlemen—to the cost of the houses on Belle-Vue-terrace (which will hereafter be sold)—to the additional ground at Hull for the terminus, &c.—and also for an extra quantity of land on the line of railway—to the extra cost of iron rails, by increasing the weight from 40*lbs.* to 54*lbs.* per yard—to the difference in the cost of laying the way with longitudinal bearers of timber with cross sleepers, instead of with cross sleepers only—to the great advance in the price of sleepers in consequence of the demand for them, as well as to the cost occasioned by Kyanising them—with many other expenses which, however comparatively small, swell the aggregate to a considerable amount, probably not much less than 130,000*l.* In order to meet this additional expense, the directors beg to suggest the propriety of this meeting empowering them to borrow the whole or such part of the sum of 183,000*l.* authorized by the Act of Parliament to be raised, at such time, in such sums, and on such terms as they may deem best for the interests of the company; and should this proposition be acceded to, they would recommend that the same interest should be allowed, 5 per cent., as is given by other companies; they have already received tenders of con-

siderable sums, which they did not choose to accept until this meeting had sanctioned the proposition, in order that all the shareholders might have an opportunity of profiting by this sort of investment if they thought proper so to do; and they anticipate that the full amount required will be advanced by members of the company, who will, of course, by this means have a preference to other applicants for the company's bonds.

Notwithstanding this addition to the expenditure, the directors feel undiminished confidence in the prospect before them. Last year they had the pleasure of reporting, that the trade of the port for the year 1837 had then increased beyond all former precedent, and they have now the additional gratification of stating that the year 1838 exhibits a still greater increase. The Dock Company, in addition to making another dock on the east side of the Old Harbour, have determined to make an additional entrance into the Humber Dock, sufficiently wide to admit the very largest class of steam-vessels which cannot pass through the present locks; the entrance from the Humber Dock into the Junction Dock is also to be widened to answer the like purpose; and as both these docks will communicate with the terminus of the railway, the benefits to be derived therefrom to the trade of the port in general, and to this company in particular, are evident. When it was determined to bring the subject of further accommodation for the trade of the port before the proprietors of the docks, at a special meeting about to be held for that purpose, the directors conceived they would not be doing justice to the interests they represented, did they not state the advantages which would result from the additional accommodation being made on the west side of the town, and they accordingly prepared and sent a letter to that body, explanatory of their views upon this subject; and although they think it would have been better had the dock been made to the west, the alterations projected there must prove so highly advantageous to the general trade of the port, as to leave little cause to regret the decision to which upon that occasion the dock company came.

It may not, perhaps, be out of place here to advert to a paragraph which has lately appeared in most of the London and country newspapers, intimating that it was intended to use horses instead of locomotive engines on the Leeds and Selby Railway. Now, as this is an undertaking the most intimately connected with our own, and such reports, even if false, are calculated to have an injurious effect, the directors are happy to inform you that there is not, nor has there ever been, the slightest foundation for the report. The traffic on the Leeds and Selby Railway has been greater during the past than in any preceding year, in addition to a very large increase in that of merchandise, coals, and lime, the number of passengers conveyed the last year exceeds by many thousands those of the previous year; and there are at present several effective locomotive engines at work upon it.

The directors cannot pass over unnoticed the present depreciation of shares in the market; for this fall, as there is no just or real cause, it is difficult rationally to account. Doubts of the success of the undertaking have certainly been insinuated, rather than expressed, by some persons, from motives best known to themselves, and these doubts, backed by the sale of a few shares belonging to proprietors resident in the neighbourhood, are soon circulated abroad; whilst the more certain and solid testimony to its excellence, which is afforded by the investment of a numerous body of shareholders resident in Hull, who must, therefore, necessarily possess the best means of information, is totally overlooked or disregarded, because unknown to distant proprietors; and when the directors refer to the flourishing state of the port, to the great increase yearly taking place in its commerce, to the addition to its

shipping, especially to the vessels employed in steam navigation, they fearlessly assert that a line of railway from such a port, with gradients peculiarly favourable—communicating with Liverpool by other railways passing through the most densely populated cotton and woollen manufacturing districts in the kingdom, and also communicating with London by the North Midland, Midland Counties, and London and Birmingham Railways—cannot fail to remunerate the proprietors; and that if this undertaking does not answer, none can. A railway from Bradford to Leeds is contemplated, and will probably be made. Every year is developing some circumstance or other advantageous to the port of Hull, and it is most devoutly to be hoped that its inhabitants may see the propriety of cordially uniting in measures calculated to promote their common interest.

The directors are not without hope that a coal and lime trade will be brought to Hull; this will be a great advantage to the town, and also benefit the railway proprietors. There are collieries and lime works immediately adjoining the Leeds and Selby Railway; with the proprietors of these communication has already been had on the subject, and they think that Hull may ere long have an export of coals, which has hitherto been carried on to a very small extent.

The directors have again to express their unqualified approbation of all the resident officers of the company. They might with full justice reiterate all that was said respecting them at the last meeting, or if it be necessary to add one word, it would only be to mark the, if possible, increased zeal, activity, and judgment displayed by all.

From the engineers-in-chief also, the directors have received much valuable assistance. One or other of them has been frequently over the line during the past year, and they have been anxious, in accordance with the wishes and instructions of the directors, to forward the works by every means in their power.

Agreeably to the provisions of the Act of Parliament, the five directors who go out of office by ballot are Mr. Tottie, Mr. Pease, Mr. Pim, Mr. J. G. Marshall, and Mr. Egginton, but they are re-eligible.

In concluding a report which has been extended to a greater length than they wished, in order to lay before the proprietors a statement of the principal occurrences of the year, the directors venture to express their confidence that the company will not consider them to have neglected the trust reposed in them; and at the same time they beg to assure them that an active and vigilant attention shall continue to be paid by them to the superintendence of this great undertaking, and every possible exertion used to complete it for opening in the spring of 1840.

The following is an abstract of the accounts for the past year :—

The Hull and Selby Railway Company, from Feb. 24th, 1838, to January 31st, 1839.

<i>Dr.</i>	<i>£.</i>	<i>s.</i>	<i>d.</i>
Jan. 31, 1839.—To cash paid for land, compensation, &c.	58,682	3	7
Law charges, including jury trials, conveyances, stamps, &c.	2,962	11	3
Resident engineer, and four superintendents, salaries, labourage, &c.	1,246	12	2
Secretary and clerk's salaries, office rent, taxes, coals, postages, and petty expenses	592	0	0
Travelling expenses	57	12	3
Expenses of witnesses in jury cases, &c.	208	18	3
Direction from July 16, 1836, to Feb. 23, 1838	577	0	0
Direction from Feb. 26, 1838, to Jan. 31, 1839	321	0	0
The land committee, from Jan. 24, 1837, to Nov. 29, 1838	456	12	0
Advertising, printing, stationery, &c.	93	9	1

Sundry proprietors for interest on money advanced on account of future calls	£.	s.	d.
Cash paid for iron rails, freight, &c.	9,238	11	3
Ditto paid for samples of sleepers, &c.	17	6	0
Ditto paid for timber, painting houses, &c.	41	15	5
Ditto advanced to contractors as under :—			
Chas. Faviell—Hull or foreshore contract	£200		
Townshend and Harker—ditto	4,160		
	<u>4,360</u>	0	0
Townshend and Harker—Hessle do.	15,600	0	0
Pratt and Fenton—Brough do.	1,890	0	0
Executors of A. Pratt—Market-Weighton embankment do.	4,370	0	0
Ditto Market-Weighton bridge foundations do.	1,670	0	0
Chas. Faviell—Howden do.	7,630	0	0
Chas. Briggs—Selby do.	2,560	0	0
Ditto—Foundations of Selby bridge do.	3,105	0	0
Marshall, Barber, and Co., on account of the iron superstructure of the Market-Weighton canal bridge	1,000	0	0
	<u>117,019</u>	3	4
Balance carried down	801	12	2
	<u>£117,820</u>	15	6

<i>Cr.</i>	£.	s.	d.
Feb. 24, 1838.—By balance in hand	38,195	2	2
The 1st call and deposit received on ten shares	50	0	0
The 2d do. on 1,123 do.	5,615	0	0
April 16.—By the 3d do. on 8,000 shares at 5 <i>l</i>	£40,000		
Deduct the call on 235 shares belonging to proprietors who paid in advance	£1,175		
On 570 shares unpaid	2,850		
	<u>4,025</u>		
	35,975	0	0
Sept. 17.—The 4th call on 8,000 shares at 5 <i>l</i>	£40,000		
Deduct the call on 292 shares belonging to proprietors who paid in advance	£1,460		
On 966 shares unpaid	4,830		
	<u>6,290</u>		
	33,710	0	0
Interest received on the 1st and 2d call, paid after due	135	19	5
Ditto 3d do. do.	93	8	3
Ditto 4th do. do.	58	11	7
Ditto on cash in the bankers' hands to Dec. 31, 1838—			
Messrs. Pease and Liddells	£197	16	3
Messrs. Samuel Smith, Brothers, and Co.	205	4	6
	<u>403</u>	0	9
The rent of four houses on Belle Vue Terrace for three-fourths of a year, and of one house on Foreshore Terrace for four months	189	13	4
Cash received from sundry proprietors in advance of calls	3,395	0	0
	<u>£117,820</u>	15	6
Jan. 31, 1839.—By balance brought down in the bankers' hands, viz.—			
Messrs. Pease and Liddells	£509	5	11
Messrs. Samuel Smith, Brothers, and Co.	292	6	3
	<u>801</u>	12	2

General Summary.—The Hull and Selby Railway Company.

<i>Dr.</i>	£.	s.	d.
Aug. 31, 1836.—To sundry payments to this day, as per account	7,908	19	2
Feb. 23, 1838.— Ditto ditto ditto	37,838	11	11
Jan. 31, 1839.— Ditto ditto ditto	117,019	3	4
To balance in hand carried down	801	12	2
	<u>£163,548</u>	<u>6</u>	<u>7</u>

<i>Cr.</i>	£
By the deposit and 1st call on 8,000 shares, at 5 <i>l</i> .	£40,000
Ditto, and 2d do. on 8,000 do., at 5 <i>l</i> .	40,000
Ditto, and 3d do. on 8,000 do., at 5 <i>l</i> .	40,000
Ditto, and 4th do. on 8,000 do., at 5 <i>l</i> .	40,000
	<u>160,000</u>

Less—

Unpaid of the 1st call, 2 shares, at 4 <i>l</i> .	£8
Ditto of the 2d do., 291 do., at 5 <i>l</i> .	1,455
Ditto of the 3d do., 570 do., at 5 <i>l</i> .	2,850
Ditto of the 4th do., 968 ditto, at 5 <i>l</i> .	4,830
	<u>9,143*</u>
	150,857 0 0
Interest on calls paid by proprietors after due	390 3 4
Ditto allowed by the bankers	2,070 5 11
The deposit of 1 <i>l</i> . per share on 3 shares given up	3 0 0
Subscription to the survey from non-shareholders	83 4 0
Rents of houses on Belle Vue Terrace, &c.	189 13 4
Cash received of shareholders in advance, after deducting the calls already due	9,955 0 0
	<u>£163,548 6 7</u>

Jan. 31, 1839.—By balance in hand brought down . . . £801 12 2

GLASGOW, PAISLEY, KILMARNOCK, AND AYR RAILWAY.

General Meeting of shareholders, 7th February, 1839.—The Half-yearly meeting of shareholders of this company was held pursuant to Act of Incorporation, at the Railway-office, in Gordon-street, this day, at 12 o'clock. There was a large and highly respectable attendance. In the unavoidable absence (through illness) of Mr. McCall, the Chairman, Mr. Fleming, of Claremont, presided. The advertisement calling the meeting having been read, Mr. Humfrey, Secretary to the directors, read the following

REPORT.—Your directors have now the pleasure of laying before you the annexed balance sheet of the company, showing the state of its funds on 31st December, 1838. It will be observed that great progress has been made, during the last six months, in obtaining payment of the arrears of calls, and that the amount now outstanding is comparatively small. A considerable number of shares have been paid upon, even since December,

* The amount outstanding for calls was reduced to 8,668*l*. by the payment of 475*l*. on the morning of the day of meeting.

and your directors anticipate, that not more than about 300 out of the 12,500, will ultimately require to be forfeited.

In consequence of the light nature of the works in Ayrshire, it has hitherto been found necessary to make only two calls on the shareholders, amounting to 10*l.*, including the deposit; yet the balance sheet shows a sum in bank on 31st December of 41,403*l.* 12*s.*—a fact which is the more gratifying, when the advanced state of the operations is taken into account. It is right, however, to mention, that from the extensive works which are now in progress, and from the heavy payments which must be made next summer, for rails, blocks, and engines, three calls of 5*l.* sterling each, will probably be required during the current year, in addition to the one which has been already declared, and which is payable on the 19th instant. But when these calls are met, the company will be able to exercise, if they think fit, the power of borrowing to the extent of one-third of the capital, in place of calling on the shareholders for any further advance to complete the works.

Since the last half-yearly meeting, your directors have redeemed their pledge of letting the whole of the main line from Glasgow to Ayr. It is now contracted for, from end to end, at reasonable rates, and in such a manner that the last portion of it will be completed and ready to open by the 1st of May, 1840. The shareholders are referred to the annexed reports by Mr. Miller, the engineer on the line between Ayr and Paisley, and by the committee of directors on the joint line between Paisley and Glasgow, for detailed information as to the progress of the works. It will be particularly gratifying to them to learn that 11 miles of the railway between Ayr and Irvine, will be opened within *four* months from this date, being a month earlier than the period fixed by the contractors, and that other three miles, between Irvine and Kilwinning, will be completed before the 1st of October next. Before the next half-yearly meeting, therefore, the company will be in receipt of revenue from local traffic, on above a fourth, but least productive portion, of the main line.—This is a striking fact, when it is considered that nine months have only elapsed since the first spade was put into the ground, and that a fifth part of the capital is all which the shareholders have yet been called upon to pay.

Your directors feel desirous to give the fullest information as to the cost of the works now in progress, and from their advanced state, they are enabled to do so with considerable certainty. One way of communicating this information would be to publish the actual amount of each contract, but many objections exist to such a course both on the part of the contractors and of the company. Your directors can only therefore request the shareholders to receive the following abstract, on their guarantee, that it forms the nearest approach to accuracy, which they can at present make.

1. From Ayr to Irvine, 11 miles. The land on this section, including sites for depots at both places, has been bought. The works are nearly finished. The buildings at the stations have been contracted for. The blocks, chairs, and rails have been purchased. The *whole* will be completed for a sum not exceeding 7,000*l.* a mile, exclusive of the *buildings* at the depots.

2. From Irvine to Dalry, 7 miles. The land on this section, and the sites for depots at Kilwinning and Dalry, have also been bought. The works are contracted for, and between Irvine and Kilwinning are far advanced. But the *buildings* at the stations have not been let, and the blocks, chairs, and rails, are not yet ordered. Making a liberal allowance for these, however, this section will be completed for a sum not exceeding 13,000*l.* a mile.

3. From Dalry to Johnston, 12 miles. The land on this section has not yet been purchased, and the blocks, chairs, and rails are not ordered. But the contracts for works are all completed, and it is confidently anticipated that this portion will be executed for a sum not exceeding 10,500*l.* a mile.

4. From Johnston to Paisley, 3½ miles. A considerable portion of the land on this section has been bought, and the remaining portion is mostly under arbitration. The works, with the exception of the blocks, chairs, and rails, are contracted for. This section will be completed for a sum not exceeding 20,000*l.* a mile.

It will be seen from the above statement that the thirty-three miles from Ayr to Paisley will be finished for a sum not exceeding 11,000*l.* per mile, on the average, a circumstance almost unparalleled in the history of railways up to the present day.

5. From Paisley to Glasgow, 6½ miles. A part of the house property in this section, and of the ground required for the depots both at Paisley and Glasgow, yet remain to be purchased. The line between Moss-street, Paisley, and West-street, Glasgow, including the arching in the town of Paisley, is contracted for, but the arching over the streets of Tradeston has not been let. It would be premature, therefore, to name any sum, per mile, as the probable cost of this section. One-half of the total amount is payable by the Greenock, and one-half by the Ayrshire company. (See Report of Joint Line.)

From the preceding abstract, it is obvious, that the works between Glasgow and Ayr are proceeding vigorously and successfully towards completion; and your directors have no doubt, that when the line is opened from end to end, the traffic upon it will greatly exceed that which was proved in Parliament.

In corroboration of this fact, so important to the shareholders, it may be mentioned that the Parliamentary estimates of revenue, which showed 12 per cent. on the cost, were founded solely on the *existing* traffic in 1837, exclusive of dues for the carriage of minerals, and of traffic in passengers between Glasgow and Liverpool, Belfast, Dublin, &c., who may land or go on board at Troon or Ardrossan, and thus save the circuit of the Clyde. The Parliamentary estimates also excluded all sea-bathing passengers from Glasgow and Paisley, to the watering-places on the coast of Ayrshire.

But since the line has been commenced, these sources of additional traffic are daily developing themselves. Several extensive coal fields have been already opened in the immediate neighbourhood of the line in Ayrshire, and one of the iron fields near Dalry has been let at a fixed rent of 1,000*l.* per annum, for the supply of blast furnaces to be erected near the depot at that town. The person who has taken this has declared to the company, that he contemplates sending, at least, 80 tons per diem by the railway. A company has also been formed to build a steam-vessel to ply between Troon and Liverpool, as soon as the railway is opened. Another company is proposed for establishing a similar vessel between Ardrossan and Belfast; and steps are taken by influential proprietors in the Western Isles, to build a steam-vessel for the purpose of bringing passengers, also cattle and produce, from Skye, Mull, and the main land opposite, to Troon or Ardrossan, to be thence conveyed by the railway to the markets in Glasgow, Paisley, and Kilmarnock, and eventually to Edinburgh.

The preparations for relaying the Ardrossan and Kilwinning railway with rails which will admit of locomotives travelling upon it at high rates of speed, have been considerably advanced since last report; and your directors count on the operations being completed by October next, so that the traffic on this branch will commence from the first opening of the company's

line to Kilwinning. It is likewise proper to mention that a detailed survey and report have been made by Mr. James Walker, and Mr. Miller, civil engineers, on Ardrossan harbour. When the suggested improvements are completed, there is little doubt that Ardrossan will be one of the most important packet stations in the west of Scotland.

In connexion with the subject of additional or prospective traffic, not included in the Parliamentary estimates of revenue, your directors beg also to refer to the proceedings which have taken place during the last six months, towards obtaining a detailed survey of a line of railway between Kilmarnock or Ayr, Dumfries, and Carlisle. They are happy to report, that great interest exists in the west of Scotland, in favour of this important measure. An influential meeting of the landed gentlemen of Dumfriesshire took place on the subject a few weeks ago, at Dumfries, with the Marquis of Queensberry in the chair, when resolutions were passed and a subscription entered into to procure a survey. Similar meetings have been held in Kilmarnock, Thornhill, Sanquhar, and Ayr; and the Edinburgh and Glasgow railway company, as well as your directors, have contributed towards the fund. The directors are also informed by a communication from an influential proprietor in several English railways, that the Newcastle and Carlisle, the Carlisle and Maryport, the Preston and Lancaster, the North Union, the Manchester and Bolton, the Liverpool and Manchester, the Grand Junction, the London and Birmingham railway companies feel themselves deeply interested in promoting an undertaking, which would bring upon their lines the traffic of Lanarkshire, Renfrewshire, Ayrshire, and Dumfriesshire, and would not only unite the two most extensive manufacturing districts of Great Britain, but form an important trunk communication between England and Scotland. The advantages to the Glasgow and Ayrshire railway company, from such a prolongation of their line, are incalculable.

The prospect of an English junction railway being formed from Kilmarnock to Carlisle, enters into the question of the expediency of immediately executing the branch from Dalry to Kilmarnock, or of substituting a more circuitous but less expensive branch in its place, on a worse level. Your directors have given this subject their earnest attention, and the result of their deliberations is, *that the great traffic both in goods and passengers between Kilmarnock and Glasgow, will justify the execution of the present line, independent altogether of the prolongation of the railway to England*, although the probability of that prolongation no doubt adds greatly to its importance. Your directors therefore recommend, that the present branch be made at the earliest moment that will suit the convenience of shareholders in paying the calls, and, in the meantime, that care be taken, that the right to make it is not lost by the expiry of the company's compulsory powers to take land. Acting on these considerations, your directors have caused notices to be given of their intention to apply to Parliament, in the session of 1840, for a renewal Bill. They have also included in these notices, a small branch from the Broom embankment, on the Ardrossan Railway, to near Irvine, which it was agreed to substitute in place of one called the Longford branch, embraced in the original survey of the line. Your directors have further seized this opportunity, of obtaining, without additional expense, power to form a branch of about four miles in length, from a point on the railway midway between Glasgow and Paisley, to the manufacturing districts of Neilston and Barrhead,—the traffic with which is so extensive as to ensure a great increase of revenue to the company. Your directors, from the outset of the undertaking, have looked upon this branch as one of the utmost importance, and, accordingly, in the negotiations with the

Glasgow and Greenock railway company in Parliament, they stipulated for exclusive power to make it. Its cost will be comparatively small, and the traffic on it will be chargeable by the joint line committee with only a rateable proportion of dues, corresponding to the distance passed over, in place of being subjected to the operation of the clause which authorizes the companies to charge dues for six miles, even where the distance travelled is greatly shorter.

Your directors are not aware that there is any other general subject which it is necessary for them to notice in this report. A code of bye-laws for the regulation of their proceedings, will be read to you by the secretary, and submitted for your approval. It is right also to mention, by the Act of incorporation, one-fourth of the present directors retire from office at this time, and that three vacancies have occurred during the year, which have only been temporarily filled up. There are thus eight directors to appoint at the present meeting, and it will rest with you to say, whether you will re-elect those who have acted up to this date, or name others in their place. The following are the names of the gentlemen who now retire, viz:—The Right Hon. the Earl of Eglinton; Messrs. James M'Call of Daldowie; John Fleming of Claremont; G. More Nisbett of Cairnhill; James Campbell of Moore Park; Robert Eccles of Glasgow; A. Fletcher of Glasgow; Hugh Miller of Ayr.

In conclusion, your directors may be permitted to mention that, during the last six months, they have had no fewer than seventy-four meetings (some of great length) on the business of the company—or at the rate of one for every two days. They refer to this, simply to show that they have not been inattentive to your interests, and they beg to assure you that, so long as they continue in the management of the undertaking, they will not spare time or labour to bring it to a speedy and successful completion.

(Signed)

JAMES M'CALL, *Chairman.*

JOHN FLEMING, *Deputy Chairman.*

Glasgow, Feb. 7, 1839.

Mr. Humfrey then read the engineer's report to the directors, and also the report of the committee on the joint line from Glasgow to Paisley.

Report of John Miller, Esq., Engineer, to the Directors of this Company.

In compliance with the instructions of the directors, I beg leave to submit for their information the following report as to the state of the works on the line between Ayr and Paisley:—

First, As to the portion of the line between Ayr and Irvine, extending to nearly 11 miles, and which is contracted to be finished by the 1st day of July next. The cutting and forming of this portion is far advanced, and I have little doubt that the whole of it will be formed by the end of this month; the stone walls by which it is fenced, are also far advanced, and are likely to be wholly completed by the first of May. The contractors are generally proceeding rapidly with the laying on of the ballasting and dressing the line, and several miles of this portion are now ready for being laid with the permanent rails. A considerable quantity of rails and chairs have been received, and the laying of them would have been proceeded with ere this, but for the want of stone blocks. These, however, are in course of receipt, and the rail-laying will be immediately commenced. A considerable quantity of the blocks requiring to be brought from the Island of Arran, the boisterous weather has very much impeded their delivery upon the line.

On the whole, I think that this portion of the railway will be ready to be opened in the month of May, or beginning of June next; and if this can

be accomplished—of which I have little doubt—it will only have taken eleven months for its completion. Engines and carriages have been ordered to suit this early opening.

Second, As to the portion of the line between Irvine and Kilwinning, extending to upwards of four miles, and which is contracted to be finished by the 1st of October next. The works of this portion being heavy, are not so far advanced as those on the portion between Ayr and Irvine; but I am glad to say, that they are proceeding, on the whole, so as to be completed by the time specified in the contracts, if not considerably before it. These works were only commenced in the month of June last, and since that time the embankments on the Irvine Water Contract, which extend to upwards of 350,000 cubic yards, have been fully more than half made up; and so far as this contract is concerned, there seems but little doubt that it will be completed within the time. The winter weather has been against the contractors; but it has been made up for in both this portion and the one between Irvine and Ayr, by working night shifts. The large bridge called the Fullerton Bridge, across the Irvine water, is now ready for the arches being thrown, and the contractors are busy preparing the stones for that purpose. It will be finished early in summer. The Eglinton-bridge across the Garnock water, which is also large, is now about finished. The contractor for this bridge, Mr. Barr, has pushed well forward, and will have the bridge completed seven months within his time. The Kilwinning contract is not so far advanced as the Irvine water one, in consequence of the nature of the stuff to be cut, and the wetness of the season. The contractors have now, however, got through their clay cuttings, and will be able to advance rapidly.

Third, As to the portion of the line between Kilwinning and Dalry, extending to upwards of three miles, and contracted to be finished by the 1st of May, 1840. This portion having been only lately contracted for, there has not yet been much done. It has been commenced at several places, and Mr. Milne, the contractor, is making active preparations for carrying it on.

Fourth, As to the portion of the line between Dalry and Johnstone, extending to nearly 12 miles, to be finished by the 1st of May, 1840. The directors are aware that the contracts for this portion have only just been completed. It is the only part not yet commenced between Glasgow and Ayr; and as there is no heavy work upon it, I count on its being completely finished by the time stipulated in the specifications, viz., 1st May, 1840.

Fifth, As to that portion of the line between Johnstone and Paisley, extending to nearly 3½ miles, and contracted to be finished by the 1st of April, 1840. In consequence of the difficulty of obtaining possession of the ground, the contractors were not able to make a commencement so soon as they wished; but they are now fairly commenced, and making good progress with the work—one of the heaviest bridges being about ready for the arch. It is rather early to judge, from what has been done on this portion of the line, when it may really be completed; but, considering the character of the contractors, I have every reason to believe that they will be able to keep their time; and Mr. Barr, who has been less retarded than Mr. McNaughton, bids fair for this.

I have now gone into the state of the works on the whole line; and, considering the progress which has been made, I have every reason to believe that the whole railway between Ayr and Paisley will be finished and opened for the public in the month of May, 1840, with a portion of it in May next, and a further portion in September next; and, if so, a part of

the line will only have taken eleven months for its execution, while none of it will have taken more than eighteen months.

Edinburgh, 6th February, 1839.

J. MILLER.

Report of the Committee of Directors on the Joint Line of Railway between Glasgow and Paisley.

The Committee on the Joint Line, in giving a summary of their proceedings, have satisfaction in stating, that in every department of the works under their direction, considerable progress has been made.

They feel that the best information they can afford will be found in the annexed particulars, given them by Mr. Errington, Mr. Locke's able assistant, on this portion of the railroad.

"The land plans for the Tradeston contract, in Glasgow, are furnished, and the works will be commenced in the spring.

"Mr. Brassey's works are well stocked with materials, which are all in full occupation. The first point of any moment on the Ibrox and Arkleston contracts, both of which are in Mr. Brassey's hands, is the cutting at Ibrox. 60,000 yards have been turned out here, and the same rate of progress ensures completion in good time. The cutting through the Arkleston Hill is the key to the works on the Joint line, and here every effort is making, and the operations are pushed forward by the contractor with skill and judgment.

"Although the tunnel is only 200 yards long, it has been thought best to make the time of its completion more certain, by sinking a shaft midway. This is done; and the tunnel is worked both ways. The Paisley side is also open, and thus four faces are actually at work; 100,000 cubic yards have been excavated in this cutting, and 80 yards of the drift of the tunnel are finished.

"The works in Paisley are proceeding with rapidity for the season; the street bridges and walls are considerably advanced, and the large bridge over the river Cart is built above flood water. The intermediate lengths are slight embankments of four and five feet, and are in course of formation.

"From excellent ballast having been found at convenient points along the line, and Mr. Brassey having contracted for making and upholding the permanent way, a very good road may be anticipated. Rails and chairs in sufficient quantity for carrying forward the works, are in course of receipt; and it is confidently expected that several miles of road will be laid in the spring. The contractor is now in possession of the whole of the land as far as Paisley, and part of that required for the Paisley depot has also been acquired on fair terms."

The committee have given much thought and attention to the Glasgow terminus, and a sub-committee is now sitting, having for its special object all matters connected with these works, which are not of such a nature as to cause anxiety, regarding the time of their completion. Finally, it is due to the respective boards to add, that the works of every description are let at fair rates, and the committee see no reason to expect that the outlay will be materially increased, unless it shall be considered desirable for the permanent interest of both companies to possess themselves at once of a sufficient quantity of land to afford ample accommodation for their expected traffic.

JOHN FLEMING, *Chairman.*

Glasgow, 6th February, 1839.

Balance sheet of the Glasgow, Paisley, Kilmarnock, and Ayr Railway Company, December 31, 1838.

	£.	s.	d.
To amount of receipts per statement published December 20, 1837	22,793	12	4
„ Arrears of deposit received since	8,416	10	0
„ Amount of 1st call, of 2l. 10s., on 11,492 shares	28,730	0	0
„ Ditto of 2d call, of 6l. on 10,630 shares	53,150	0	0
„ Ditto received in anticipation of calls not yet made	3,485	0	0
„ Interest on calls	332	17	8
„ Ditto from bank	329	3	8
„ Ditto from joint committee	97	9	9
„ Amount of transfer fees*	5	5	0

* These fees have since been remitted.

117,339 18 5

	£.	s.	d.
By amount expended as per statement of Dec. 20, 1837	21,166	3	5
„ Land and compensation	9,345	6	8
„ First instalment to Renfrewshire road trustees	6,000	0	0
„ Works	20,883	8	4
„ Amount expended by joint committee, see schedule A.	13,257	14	0
„ Engineering accounts	1,123	17	3
„ Solicitors' and agents' accounts	897	8	2
„ Advertising, printing, stationery, and engraving	673	8	10
„ Travelling expenses, postages, and parcels, petty charges, furniture, and rent	649	14	10
„ Salaries and police, including late secretary's account	1,139	4	11
„ Charge for direction to the present time*	800	0	0
	75,936	6	5

Balance in bank	29,549	6	5
In Western bank, Glasgow, for joint committee	11,839	15	9
Ditto in secretary's hands	14	9	10
	41,403	12	0

117,339 18 5

E. E. Glasgow, Dec. 31, 1838.

ARCHIBALD SMITH, WILLIAM BROOKS, *Directors.*

* Sum voted by last general Meeting to directors for past services	500	0	0
Charge for direction, six months	300	0	0
	800	0	0

Balance Sheet Joint Line Schedule A, from 1st January to 31st December, 1838.

	£.	s.	d.
To Deposits from Greenock and Ayrshire Cos.	50,000	0	0
„ Interest	194	19	6
	50,194	19	6

	£.	s.	d.
By land and compensation	12,273	16	10
„ Advances on do. to meet arbitration	2,533	3	2
„ Works	10,604	11	9
„ Engineering	806	3	4

	£	s.	d.
By Office expenses, including furniture, stationery, miscellaneous accounts, postages, and petty charges	170	19	6
„ Travelling expenses	40	11	2
„ Advertising	26	11	0
„ Police	59	11	3
	<hr/>		
	26,515	8	0
Balance in Western Bank	23,679	11	6
	<hr/>		
		£50,194	19 9
		<hr/>	
One-half of the above Deposit is		25,000	0 0
Do. do. Interest is		97	9 9
		<hr/>	
		25,097	9 9
		<hr/>	
One-half of the above expenditure	13,257	14	0
Do. do. in Western Bank	11,839	15	9
	<hr/>		
		25,097	9 9
		<hr/>	

J. H. HUMFREY, MARK HUIJSH, *Secretaries.*

MARYPORT AND CARLISLE RAILWAY.

General Meeting held at Aspatria, Feb. 12, 1839.

REPORT.—The directors have great pleasure in meeting the proprietors of this undertaking, and in laying before them an account of the receipts and disbursements, and a statement of the progress of the works, from the time of their commencement until the 31st of December, 1838.

In October, 1837, instructions were given to the secretary to make agreements on behalf of the company, for the purchase of the required land, by submitting the value thereof to arbitration, as well as all matters of dispute that might arise in the execution of the works as to damages and compensation. The purchasing of the land for this 8½ miles has been completed, and compensation for crops and damages settled amicably, by the company's agent, and the parties themselves interested. The small parcels of land severed by the railway, have chiefly been purchased for the company, and thereby frequent crossings have been avoided, as well as the expense and necessity for the construction of occupation bridges. The whole of the iron rails and chairs, the stone blocks and wood sleepers, have been contracted for. A locomotive engine is being constructed, carriages and every other requisite will be provided for completing and opening this very beautiful and interesting portion of the line in September next. A confident hope is entertained that the execution of the work will not materially exceed the revised Parliamentary estimate, and the completion of the first portion of a difficult part of the line, is the best earnest the directors can give of their intention and ability speedily to complete the whole of this important undertaking.

Statement of the Accounts of the Maryport and Carlisle Railway Company.

RECEIPTS.

		£.	s.	d.
To proprietors on deposits and calls		19524	0	0
To balance of interest on calls		159	13	4
To shares by landowners and others		2114	0	0

	£.	s.	d.
To wood sold	0	18	0
To account of shares paid up	2311	13	6
To cash balance due to the directors	15	10	7
	<hr/> 24,125 15 5 <hr/>		

EXPENDITURE.

By payments for obtaining Act of Incorporation	5817	10	8
By land and compensation and expenses attendant	4565	0	9
By materials, wood, iron, and stone	757	11	6
By works of roads and bridges	10951	0	3
By engineering	1000	0	0
By conveyancing	20	0	0
By secretary's salary	125	0	0
By do. travelling expenses to Newcastle	4	8	0
By do. to Liverpool	8	8	6
By do. Sundries	3	9	4
By office rent and expenses attendant	22	18	7
By postages	12	6	2
By direction	11	3	1
By advertisements and stationery	46	19	3
Total expenditure	£23,345	6	1
By balance of banker's accounts	779	19	4
	<hr/> £24,125 15 5 <hr/>		

WILLIAM MITCHELL, *Secretary.*

ENGINEER'S REPORT.

GENTLEMEN,—Since I reported to you on the state of your works, on the 30th of August last, Mr. Stephenson on the 26th of November reported personally to a meeting of the directors of their continued and satisfactory progress. Since that date, the works have advanced more slowly in consequence of the shortness of the days and the variableness of the season. As soon as the days lengthen, the contractor will be required to put on a renewed force, and I cannot foresee any difficulty occurring to prevent the completion of his contracts by the stipulated time, the first of September next. Since the commencement of the undertaking on the 30th of April, to the 30th of December, 1838, the date of the last measurement of the works, about 170,000 cubic yards of earthwork have been removed, and 3,457 cubic yards of masonry finished, besides a large quantity of stone laid down and dressed, ready for immediate setting in the bridges and culverts still to be erected.

The bridge over the railway at the Cockermouth turnpike-road has been completed. The arch, abutments, and main structure, stand in a firm and substantial manner. In two of the wing walls a slight slip has occurred, which the contractor in the spring will easily repair. The Askew bridge at the Workington road has the abutment completed and ready for turning the arch. A great proportion of what will become the permanent fencing has been put up.

The repeated floods have made some inroads on the sides of the river diversions, which, as soon as the permanent way is laid, will be easy of

repair, and the new courses of the river Ellen will be ever after under a ready and cheap command. The deepest and heaviest cuttings along that part of the line now in execution are nearly completed, and the only remaining ones least advanced, are from their strata easy of removal. A great part of the line now forming is ready for ballasting and laying the permanent way, as soon as the iron rails arrive.

The greatest number of men at any time employed has been about 446. The present number is about 192, and about 50 horses. I am, gentlemen, your very obedient Servant,

W. S. HALL.

To the Chairman and Directors of the Maryport and Carlisle Railway.

BIRMINGHAM AND GLOUCESTER RAILWAY.

General Meeting held Feb. 12, 1839, at Gloucester; JOSEPH WALKER, Esq., in the chair.

REPORT.—In reporting the present position of the affairs of this company, the directors have much pleasure in calling the attention of the proprietors to the very satisfactory state of the finances, and the progress which has been made in the works. The balance sheet appended to this report is made up to the 31st of December last. It contains a particular account of every item of expenditure since the commencement of the undertaking, classified under distinct heads; and the directors invite attention to the details, satisfied that they establish the fact, that in every department of the expenditure a rigid regard to economy has been observed. The calls made upon the shareholders have necessarily been heavy, but their payment has been made with great promptness. Forty per cent. of the subscribed capital has been called for, amounting, on the whole of the shares (exclusive of 245, which have been forfeited), to the sum of 371,425*l.*; and it will be gratifying to the proprietors to know that, upon this amount, the sum of 25,977*l.* 10*s.* 0*d.* only is at this moment unpaid. As regards the progress of the works, the directors feel that they have equal matter for congratulation. The total quantity of earth-work on the entire line is 3,600,000 cubic yards; of this, 3,000,000 have been contracted for, and 1,150,000 yards have been executed, and the remainder is in rapid progress. The brickwork and masonry are estimated to cost about 89,000*l.*, and of this amount, about one-third has been completed. The only bridge of magnitude on the line is that over the river Avon, at Eckington, the abutments and piers of which are completed, ready for the reception of the iron-work, which is daily expected from the contractors. For the permanent way, a large supply of materials has been procured and distributed on the line. Some portions of the way are finished, and permanent rails laid, and the contractors are busily engaged in laying down other parts. Now that the works are in so great a state of forwardness, and so large a portion contracted for, the directors are enabled to arrive, with considerable accuracy, at the total cost of the railway; and it is with great satisfaction that they are enabled to state their conviction, derived from a careful investigation of the contracts made, and the actual cost of the works to the present time, that the railway, including the cost of a branch-line to Worcester, will be completed for the subscribed capital of 950,000*l.* The directors are satisfied that this result has only been attained by the plan adopted of dividing the works into small contracts, which, although devolving very great additional labour upon the directors and executive officers of the company, has been attended with a large saving in the cost of construction. The experience of all railways already opened has shown that the number of engines and

carriages required for the proper accommodation of the public, have been much under-rated in the Parliamentary estimates, whilst from the great and increasing demand, their cost has lately been very considerably augmented. These causes, combined with the great increase of traffic which has taken place upon the road between Birmingham and Gloucester since the Act was obtained, have led the directors to the conclusion, that a considerable increase to the proposed carrying establishment of this company will be absolutely necessary. This increase will, of course, demand an addition to the capital, while the purchase which has been made of the moiety of the tram-way between Gloucester and Cheltenham, and the proposed extension of the line from the passenger depot at Gloucester to the Berkeley Canal, will require a further sum. The total cost cannot at present be exactly ascertained, but the directors feel confident it will not exceed one-half of the sum which, by the Act of Incorporation, the company is empowered to borrow. To provide for this additional outlay, and at the same time to relieve the shareholders as much as possible from the frequency of heavy calls, the directors would strongly recommend this meeting to empower them to exercise the powers of the Act, by raising the sum authorized, either on mortgage or by debentures.

In the last half-yearly report, it was contemplated that the portion of the line connecting Cheltenham, Tewkesbury, Worcester, and Droitwich, might be opened by about Midsummer next; but in considering the propriety of this step, the directors felt, that looking to the results of partial openings on other lines, it would be impossible to carry this intention into effect with advantage to the proprietors. Droitwich is situated 27 miles from Cheltenham. It is a stage and a-half from Birmingham, and without the advantage of coach establishments at the place. Under these circumstances, it was evident there would be but little probability of getting the Bristol and Birmingham coaches upon the line for so short a distance, whilst if they could be conveyed to Bromsgrove, which would bring them within 13 miles of Birmingham, and at which town there are now large coaching establishments, the coach traffic might safely be depended upon. On advising with the engineer, they found that by the latter end of December in the present year, he could construct the line to Bromsgrove, and they have accordingly determined upon postponing the opening of any part till they could complete the line to that town. The works are now being carried with a view of effecting this object, and the directors are sanguine, that early in the ensuing year, the railway will be in operation for the entire distance between Cheltenham and Bromsgrove.

The directors, satisfied that very considerable advantages will be gained to this company by carrying out the original design of extending the line from the passenger depot at Gloucester to the Berkeley Canal, recommend this meeting to authorize them to apply to Parliament for the necessary powers at the earliest practicable period.

A vacancy having occurred at the board, by the resignation of Mr. Winterbotham, the directors have had pleasure in fulfilling their intention of appointing a Lancashire director at the first opportunity, by the election of James Spence, Esq., of Liverpool.

The directors will only refer to the late special general meeting to express their satisfaction at its result. To the present time this undertaking has been conducted with much harmony and good feeling. It has been advancing towards its completion steadily and unostentatiously, and the directors trust that both they and their successors may be enabled to conduct it to a prosperous termination, by having that confidence reposed in their integrity of purpose, and in their anxious desire to promote the best

interests of the company, which has hitherto lightened their labours, and rendered them both pleasant and honourable.

Birmingham and Gloucester Railway Company, December 31, 1838.

<i>Dr.</i>	£.	s.	d.	£.	s.	d.	£.	s.	d.
To 40 per cent. called on									
9,500 shares				380,000	0	0			
Less due on 2d call	290	0	0						
„ 3d call	402	10	0						
„ 4th call	1,245	0	0						
„ 5th call	8,820	0	0						
„ 6th call	48,030	0	0						
	58,787	10	0						
Forfeited shares	8,575	0	0						
				67,362	10	0			
							312,637	10	0
To interest on calls and banking account							3,338	17	8
To 1½ year's interest on tramroad shares							1,575	0	0
To rent							84	14	0
							£317,636	1	8

<i>Cr.</i>	£.	s.	d.	£.	s.	d.
By engineering				14,292	5	9
By Parliamentary expenses				21,335	19	1
By land				84,507	12	3
By surveying and conveyancing				7,357	12	7
By compensation				8,487	5	7
By law charges				1,263	13	6
By works				101,818	16	5
By stock				3,141	13	11
By tramroad shares				17,500	0	0
By deputation and travelling expenses				2,529	18	4
By direction				2,140	15	9
By advertising				656	5	11
By furniture and fixtures				508	12	4
By office charges and salaries				4,872	0	8
By incidental expenses				190	7	7
By advances for engineering purposes				164	18	8
By cash balances this day, viz. :—						
Birmingham Banking Company	27,453	12	6			
Gloucestershire ditto ditto	19,384	3	11			
Petty cash ditto ditto	30	6	11			
				46,868	3	4
				£317,636	1	8

Note.—On comparing several of these items with those in the last half-yearly balance-sheet some considerable differences will be observed, it is occasioned by the whole of the accounts having been analysed, and various amounts transferred, in order to show the exact expenditure in each department. A balance-sheet for the last six months is also appended.

BIRMINGHAM AND DERBY JUNCTION RAILWAY. 81

<i>Dr.</i>	£.	s.	d.	£.	s.	d.
To cash in hand, June 30				12,796	18	3
To amount received on calls	147,250	0	0			
To interest on calls and banking account	736	16	11			
To half year's interest on tram-road shares	525	0	0			
To rent	66	19	3			
				148,578	16	2
				£161,375	14	5

<i>Cr.</i>	£.	s.	d.	£.	s.	d.
By engineering	4,444	3	10			
By Parliamentary expenses	246	19	11			
By land	30,669	1	6			
By surveying and conveyancing	4,808	3	0			
By compensation	390	3	8			
By law charges	729	9	5			
By works	69,337	8	3			
By stock	2,469	1	4			
By deputation	176	13	10			
By direction	300	0	0			
By advertising	127	8	9			
By furniture and fixtures	44	7	10			
By office charges and salaries	594	6	1			
By incidental expenses	5	5	0			
By advances for engineering purposes	164	18	8			
				114,507	11	1
By cash in hand, viz. :—						
Birmingham Banking Company	27,453	12	6			
Gloucestershire ditto	19,384	3	11			
Petty cash ditto	30	6	11			
				46,868	3	4
				£161,375	14	5

BIRMINGHAM AND DERBY JUNCTION RAILWAY.

General Meeting, held at Birmingham, Feb. 14; HENRY SMITH, Esq., in the chair.

REPORT.—The directors have to inform the proprietors that during the period which has elapsed since the last half-yearly meeting of this company, their best exertions have been used to expedite the completion of the works, and they have the fullest expectation that before they again meet the proprietors at the usual half-yearly period, the line from Derby to Hampton-in-Arden will have been opened for public use; the grounds of this expectation will fully appear in the report of the resident engineer as to the present state of the works, which is subjoined.

Connected with the opening of the line, the various necessary preliminary arrangements are receiving the careful attention of the directors; the plans of the different stations are being prepared, and the buildings will be forthwith commenced. With regard to the important station at Derby, an arrangement has been made with the other two companies, whose lines

meet at that place, by which the land already purchased by this company, at Castle Fields, will be divided between the three companies, for the purposes of a general station. At the same time that all necessary provisions are made in connexion with this arrangement for securing a due mutuality of accommodation, those rights which are necessary to the independence of each party have been preserved. The directors cannot but express their gratification at the satisfactory completion of an arrangement so material to the interests of the company.

An application has been made to the London and Birmingham Company as to the conveyance of the traffic of this company along their line. It is clear that in arrangements of this nature, between two lines mutually supplying each other, it is only by the application of liberal and enlightened views that the interests of both parties, as well as of the public, can be really maintained, and your directors have the fullest confidence, that it is in this spirit they will be met by the directors of the London and Birmingham Railway Company.

With a view to test the correctness of the Parliamentary estimate, the directors have caused actual observations to be again taken of the existing traffic. The result fully confirms the representations which have already been made to the subscribers on this head.

It having been judged desirable, for reasons explained in former reports, that the line to Hampton-in-Arden should be first completed for the accommodation of the London trade, the works on the Stichford line were deferred, and have not yet been commenced. The directors being strongly impressed with the desirableness of a separate and independent access to Birmingham, requested the engineer to make a report on the nature of a line down the Tame Valley direct to Birmingham, which should not fall into the line of the London and Birmingham Railway. The engineer having reported that such a line might be obtained to Birmingham at a cost not exceeding that of the line to Stichford, it is the intention of your directors, with the consent of the proprietors, to take such measures as are required by the standing orders of Parliament, to enable them to apply, in the session of 1840, for powers to make a direct line up the Tame Valley to an independent station in Lawley-street.

The proceedings of the Manchester Extension Railway Company continue to engage the attention of your directors, who will not relax in their exertions to obtain the fullest protection to which the interests of this company are entitled.

By the following statement of accounts it will appear that
The receipts of the company to the 31st of December last

were	£395,378 15 10
The disbursements	358,470 2 6
The balance in the hands of the company	36,908 13 4

ENGINEER'S REPORT.

Engineer's Office, Tamworth, Feb. 13th, 1839.

Henry Smith, Esq.,

Dear Sir,—The general progress of the works between Stonebridge and Derby during the last half year has been such as to render unnecessary the same kind of detailed description of each contract which I submitted to you previously to the last general meeting of the proprietors.

In the statement which I have now to lay before you, I shall, therefore, limit myself to such general observations as appear to be sufficient to explain the present state and progress of the principal classes of work, the fencing,

earthwork, bridges, and permanent way, except in two or three instances, where the peculiar state of the works requires me to draw your attention more particularly to them.

Fencing.—Nearly all the permanent fencing is fixed, and the quicks have been planted in the greater number of places, where they are not exposed to injury in forming the excavations and embankments.

Earthwork.—Great progress has been made with the earthwork, except in two or three instances. The excavations and embankments on the Kingsbury and Elford Contracts, to which I referred in my last report, as being the parts of the line where delay was most to be apprehended, are now so far advanced that their completion may be safely calculated upon, considerably within the required time. The excavations on the Tamworth and Derby Contracts, I regret to say, have not kept pace with similar works on other parts of the line. There is, however, no difficulty in either case that may not be overcome with a moderate degree of attention on the part of the contractor. A considerable additional number of men, and the requisite materials, have been employed on both contracts during the last fortnight, and I have no doubt that the decided course which the directors have taken with reference to these contracts, will prevent any obstruction to the opening of the line at the time hitherto contemplated.

Bridges.—Nearly all the bridges for public roads and for the occupation of land, in the embankments, are built, and the bridges over the railway are generally in a forward state; the erection of several of them not affecting the progress of other parts of the works, has been suspended during the winter months, but will shortly be resumed. The river bridges are proceeding satisfactorily. The bridges over the river Blythe and the river Dove will be finished in April. The arches of the Anker viaduct and of the Derwent bridge are finished, and the ballasting partially prepared for the permanent way. The roadway of the bridge over the rivers Tame and Trent will be finished in March.

Permanent Way.—About 19½ miles, being about one-half of the line between Stonebridge and Derby, have been laid with the permanent rails since August last, and an additional length of about 8 or 9 miles is formed. Sleepers for nearly 35 miles, and rails for 26 miles, have been delivered. In the early part of the winter, some delay was occasioned by the insufficient supply of rails, but the stock already delivered, and the regular supply which can now be reckoned upon, will enable the contractors to proceed with the permanent way without interruption.

In addition to the foregoing remarks, I have attempted to compare in a financial point of view the present state of the works, and the progress recently maintained, with the rate of progress that will be required to accomplish the opening of the line in July next. With this view, I have prepared an estimate of the probable sum required to finish the contract works, including all the bridges and other communications stipulated to be made for the accommodation of land adjoining the railway. Taking this estimate and the certificates of the amounts for works already executed as the basis of this calculation, it appears that the average rate of expenditure required for the next five months, but little exceeds that which has been required by the progress maintained during the months of December and January, under all the disadvantages of an unfavourable season. Since the commencement of the present month, a considerable additional number of men have been employed, and as the season advances a great increase may be expected in the quantity of work performed. The number of men now employed, on the whole line by the contractors, is upwards of 2,800.

The arrangements connected with the stations are in progress, and plans will be submitted to the directors at their next meeting.

In conclusion, I beg to state that there can be no doubt of the perfect practicability of opening the line in July next, and there is every reason to expect that the whole of the works will be accomplished within the sum estimated at their commencement.

I am, dear Sir, yours, respectfully,

JOHN C. BIRKINSHAW, *Resident Engineer.*

SCIENTIFIC AND MISCELLANEOUS INTELLIGENCE.

Crossley's Pneumatic Telegraph.—This is a very ingenious instrument for communicating on railways or otherwise. The principle of it is the communication of pressure from one place to another. If a tube filled with air have a reservoir at each end capable of expansion and contraction, according to the pressure on the enclosed fluid, it is evident that pressure applied at one reservoir would in a given time afterwards, according to the distance, be felt at the other. A pressure index, therefore, applied to this other, would show the amount of pressure at the first. Now having a certain number of weights, we may give as many signals, which, properly combined, will communicate any intelligence required. By having reservoirs at intermediate places or branches, the same intelligence would be communicated to all, nearly simultaneously. Mr. Crossley proposes to give notice of intention to telegraph, "by applying a pressure to the collapsing air vessel," so as to sound an organ pipe, whistle, bell, &c., at the other end. There are several ingenious suggestions for perfecting the instrument in the description we have received, but which our limits will not allow us to go into now. Experiments, Mr. Crossley says, have been tried on a returning tube of an inch diameter, of nearly two miles long, and that the index was affected at the other end in fifteen seconds, which is about 53 per cent. longer than the communication would have occupied had there been no friction in the tube. This friction, and the influence of a change of temperature, are what we are most afraid of as affecting the success of this ingenious instrument in very distant communications. However, it is obviously capable of many useful applications, and well deserves to be investigated. We hear a model of it will shortly be placed in the Polytechnic Institution, in Regent-street.

New Rotatory Engine.—Invented by Mr. Rowley, Manchester. It differs from all other rotatory engines we have seen, in the manner in which the steam acts upon it. The pistons (three in number) are furnished with pins which traverse an endless groove, formed of the segment of a circle, and an irregular curve, and in this manner they are drawn out and pushed home, so as to admit and exclude the steam, which rushes into the engine at the top, and escapes at the side. In appearance it is very similar to a fan-blowing machine, and the engine we have seen, which is six horses' power, working at 13lbs. on the square inch, and performing 70 revolutions in a minute, only occupies about three feet by one foot and a half. From the simplicity of its construction this engine will be less expensive than those ordinarily in use, and consuming less fuel. From Monday to Thursday morning it consumed less fuel by 12 cwt. than an engine of equal power working near it.—*Preston Pilot.*

Elastic Life Boat.—The inventor, Mr. Hennessy, has formerly made a voyage from Cork to London during a furious storm, and his life-boat has received the approbation of several naval officers. "This boat is perfectly

elastic, except about three-fourths of its keel, which is secured by three bars, or plates of copper or iron; one plate on each side of the keel, and one on the flat at bottom. These plates are of sufficient substance to give strength and stability, and prevent the possibility of upsetting the boat. The stem and other parts of the keel are secured by thinner plates, in joints neatly fitted one within the other, so as to give great strength to these parts, still preserving their elasticity, being the grand principle on which the whole structure depends. The timbers, which are very slight, are of oak, tarred and covered with light strong canvas, with a casing over that of thin whalebone, taken out of a stove or boiling pan, then sewed like a rope with spun yarn, and the outside finished with leather or improved canvas sewed on. By being secured in this manner, they become of great strength, and are perfectly elastic, and though bent any way they do not lose their form. They are removed at pleasure when the boat is towed away. The covering, or skin, in place of plank (an essential part of the invention) is a kind of cloth, of great strength and durability, and perfectly waterproof. For additional strength and durability there are two skins of this fabric, graduating in thickness from the outside inwards, so as to prevent any possibility of water or damp coming through. The materials of this cloth are saturated with a chemical process in the loom, which preserves it from wet and the action of the atmosphere. It always preserves its pliability, and will not heat, mildew, or rot. This boat, from its strength and elasticity, is capable of sustaining concussions that would destroy life-boats on the usual construction. Invented as far back as 1823, but the inventor has met with great difficulties in bringing his invention into use.—*From a Liverpool Paper.*

Drying of Stuffs.—An apparatus has been invented by MM. Penzolt and Levesque, for the rapid drying of stuffs of all kinds without fire or pressure. It consists of a double drum, which turns on its axis at the rate of 4,000 times a minute. The stuffs are placed in it as they come out of the water, and by the effect of rotation the water contained between the threads is carried towards the external covering of the drum, which is bored with holes. Woollen stuffs are thus dried in less than three minutes when the apparatus is small, and in eight minutes when it is larger. Flax and cotton stuffs require a short exposure to the air after being taken from the drum.—*Blackburn Standard.*

Summary of Engineering Proceedings in January.—The engineers have to regret the ravages of the weather on their great works. The Eddystone has breasted it out, but some of the top of the Plymouth breakwater was washed off, and the wooden roadway of the Menai bridge torn up. The railways have had their earthworks affected by the influence of the rains. The Great Western Railway discussion has terminated in the confirmation of Mr. Brunel's plans, and in Dr. Lardner having made a novel discovery of the properties of the atmosphere, particularly that it has a resistance.—*Wyld's Monthly Index and Register to the Metropolitan Morning Papers.*

Progress of Steam Navigation in January.—The extension of steam navigation excites much interest. Important meetings have been held in London to promote communication with India, and on the river Ganges. Lines of steamers for New York are now in agitation at Glasgow and Bordeaux. The communication between England and Gottenburg, is now the subject of negotiation with the Swedish Government. A line has been proposed from Marseilles by Barcelona, Cadiz, and the Canaries, to Martinique and Cuba. Vessels have been placed on the Upper Rhine and Danube.—*Wyld's Monthly Index and Register to the Metropolitan Morning Papers.*

Geological History of Last Month.—The principal geological events are

presented by the effects of the activity now prevailing in the volcanic basin of the Mediterranean. The eruption of Mount Etna has ceased, but that of Vesuvius continues, and in the early part of the month, supplied a great quantity of cinders and lava. Earthquakes have been felt at Edinburgh, Leicester, Berlin, and Malta. Coal has been discovered in Greece.—*Wyld's Monthly Index and Register to the Metropolitan Morning Papers.*

The Great Hurricane.—A severe hurricane has desolated the north-west of Europe. It is supposed to have come from the West Indies across the Atlantic, and spent its chief fury in the Irish Sea. Liverpool, Manchester, and Dublin particularly suffered, and the loss of shipping is very great, besides the damages to public works, parks, and trees. The loss of life in Ireland is said to have been above 200 persons. The hurricane swelled up the waters in the North Sea to such an extent, that irregular tides were produced; the coast works of Denmark, Germany, and Holland were severely injured; and the waves of the Elbe forced up into Hamburg four feet above the floor of the Exchange. A remarkable feature is, the deposition of sea-salt eighty miles inland, in Ireland, Lancashire, Cheshire, and Yorkshire.—*Ibid.*

Statue to Mr. Stephenson.—"Measures are now in progress to commemorate the services rendered by Mr. Robert Stephenson in the improvement of locomotive power. This proposition has originated with the iron trade, and a highly influential committee of iron-masters has been formed for its promotion. It is intended to erect a statue, which, on the suggestion of Mr. Hyde Clarke, is to be made of cast-iron. We believe that this material has been employed in an equestrian statue at Berlin; and no doubt exists that, by the application of zinc or other means, it may be defended from oxidation. At all events, the experiment is worth trying, as its success would enable us to use statues more extensively as a means of decoration. The committee met on the 15th instant, when models were laid before them by Mr. Loft, and several other eminent artists. We think that there is another name connected with the progress of locomotive power, which is well worthy of some tribute, we mean Richard Trevithick, the inventor of the high-pressure system, and the rival of Watt, and to whom the Spanish Government proposed to erect a statue of silver." [We have always understood the improvement in locomotives, the tubular, which has given them their great power, is due to Mr. Henry Booth. Is this gentleman to have no niche?]

River Lime Navigation.—A discussion on this subject is going on, agitated by Mr. Rooke, of Akehead, the well-known author of "Geology as a Science applied to Engineering," who has taken up the cudgels against the plans proposed by the Messrs. Stephenson. Mr. Rooke adopting their data that the force of the flux of spring tides in the river Lime exceeds that of the reflux more than two-fold, goes on to prove that it is the breakwater which is the cause of the silting up, and that, instead of shutting out the tidal action, as recommended by Messrs. Stephenson, that it is necessary to give it greater play. A gentleman in the neighbourhood, who has had some experience in river embanking, entirely concurs with Mr. Rooke.—*Lancaster Guardian.*

Machine for taking Casts of the Face or Form.—It consists of a vertical disc, whose surface is composed of an almost innumerable quantity of very fine steel wires or needles, as close together as the hairs of a brush, moving in two plates, perforated with a corresponding number of holes, with so much ease, that the points yield to the slightest pressure. Into this surface the face is gently pushed, and by a most simple and ingenious contrivance, the whole of the needles are in an instant fixed securely, their surface

presenting a concave mould of the face. Plaster is then poured in, the wires being so close that the liquid cannot escape between them, and when set hard, a working mould is taken from it, in which other casts are made. So instantaneous is the operation, and so delicate the construction of the mechanism, that the face of a crying child is taken with all its muscular contortions. A stiff beard of two days' growth would be marked in the cast.—*Spectator*.

Fuel from the Pitch Lake.—*Trinidad*.—Offers have been made to purchase a monopoly of this celebrated lake of pitch, or mine of bitumen, by two parties, agents of European companies. An experiment of its utility when mixed with an equal quantity of coal, was tried on board the *Paria* steamer. The pitch gave out a brilliant flame and great heat, generating steam with great rapidity; from its becoming semi-liquid, and running through the bars of the furnace, should it be brought into use, an alteration in the construction of the furnace will be requisite. We understand that a cargo of the bitumen is now preparing for shipment to London. The adoption of this fuel would render the Gulph of *Paria* the rendezvous for all steamers in the West Indies, and *Trinidad* the new port of these latitudes. It is supposed from the nature, extent of surface, and the depth of the lake, so far as it has been ascertained, it would supply a whole navy of steamers for centuries with fuel.—*Trinidad Standard*.

RAILWAY NOTICES.

American Steam-packets.—Projects are on foot in New York and Philadelphia for establishing lines of American steam-packets. It is to be hoped the power of steam will not be overstrained or over-done.

American Railroads and Canals.—By a letter a friend of ours has just received from America, it appears, that their canals amount to 2,500 miles and their railroads in operation, to 2,000 miles. We hope in our next, by the favour of a friend to whom it has just been sent, to be able to give the latest and most accurate list of these works that has reached this country.

American Water Works.—5,000 men are employed on works to supply New York with pure and wholesome water.

Arbroath and Forfar Railway.—The price of coals in Forfar has fallen upwards of 20 per cent. since the opening of the railway. The quantities of goods carried along the line is far greater than the most sanguine of the railway promoters ever ventured to anticipate. An extra train had to be run on Monday. The undertaking bids fair to afford a handsome return to the shareholders.—*Arbroath Herald*.

Bristol and Exeter Railway.—The works on this line are proceeding with the utmost vigour at all points between Bristol and Bridgewater. A very large force of additional workmen have been set on lately. The quantities of earthwork, and the practical difficulties and relative cost of execution are considerably less than on any other railway of the same extent and value in the kingdom.—*Felix Farley's Bristol Journal*.

Bastenne Bitumen Company.—This company is covering the arches of the Croydon Railway-station at London-bridge. This is so useful an application, and so important to the preservation of brick-work, that we recommend all our engineers and architects to see what is there being done.

Birmingham Railway.—Feb. 1st, the general meeting of this company was held at Birmingham, George Carr Glyn, Esq., in the chair. Previous to reading the report, in another part of our journal, the chairman made

some complaints against the repeated attacks of the press on the company, and dwelt on some severe remarks made by one of the police magistrates in adjudicating on a case which came before him. He was apprehensive that the public attacks would induce the Parliament to interfere. In palliation of the monopoly granted to one carrier, Pickford and Co., he read a circular addressed to other carriers by the company, in which the excuse alleged was the present want of wagons to accommodate all, but when they had enough there would be no preference. After the report had been read, declaring a dividend of 3*l.* 10*s.* per share, and asking for leave to apply for Parliamentary powers to raise another million, some discussion arose as to the amount of the new shares to be raised. The chairman said, it was the intention of the directors to make third shares (33*l.* 6*s.* 8*d.*). This was objected to by Captain Watts and others, as an awkward sum, and it was finally agreed to leave it in the hands of the directors, as also the manner in which the calls should be made, which the chairman promised to make as easy as possible. The silly plan now followed of dividing on the 25*l.* shares on which there is only 5*l.* paid, one-fourth as much as on the 100*l.* on which 90*l.* is paid, is to be avoided, and to divide the profits *pro rata* according to the amounts paid.

We make no observations on the proceedings of this meeting, and the numerous complaints that have been made to us of the mismanagement of the company and the insolence of the men employed. The latter are trifles which the directors may in future prevent, but we must confess the situation and prospects of the company, as a correspondent has shown, are awfully serious, and we dread to look into them.

A very important decision was given by Lord Denman, in the Queen's Bench, Feb. 16th. The company had diverted an old road in the parish of Pinner, between Stanmore and Uxbridge, for the purpose of making their line, and had contracted it from 40 to 27 feet wide, besides, to save embankments, had run parapet-walls for 156 feet in length. His lordship decided that a road 27 feet wide could not be as good as one of 40 feet, that the company had no right to narrow the road to extend their walls 156 feet, as they might otherwise go to any limit. He therefore directed verdicts on all three counts to be found against them.

Birmingham and Gloucester Railway.—Feb. 12, the general meeting was held at Gloucester, Joseph Walker, Esq., in the chair. After the report (see our reports) had been read, the chairman, in the course of his address observed, among other advantages on this line, that goods and passengers might be taken by it without change of carriages from Gloucester to Birmingham. He formerly stated that the line would be completed within the original estimate, 950,000*l.*, and he was glad to find that further observation had confirmed him in this opinion, except an additional outlay for engines and carriages, but this would be considerably within what they were entitled to take up under their Act. The chairman then paid some merited compliments to the zeal and ability which their talented engineer, Captain Moorsom, had displayed in the duties of his department. In answer to questions from Mr. W. M. Tartt, whether the 950,000*l.* included the stations? whether all the land required had been purchased or agreed for? whether there was a likelihood of a rival line or of the traffic being lessened by any cheaper mode of conveyance? and what would be the probable profit? the chairman answered, that the capital did include the station; that all the land had been contracted for on very favourable terms; that they do not anticipate the possibility of any rival line, but that the Severn would take the heavy, and the railway the light goods; and that allowing 50 per cent. for expenses, the probable profit would be 12½ per cent. on the outlay. After

some other discussion the meeting separated. The whole proceedings were this time conducted in a very different spirit to what they were at the previous meeting, as noticed in our last.

Birmingham, Bristol, and Thames Junction Railway.—One of the most satisfactory meetings of railway proprietors which has for some time past taken place, was held at the offices of this company, in London, the 16th of February. Rumours of alleged mismanagement had been circulated at Manchester, where a very large proportion of the shares are held, owing to a misunderstanding between one of the Manchester directors and the rest of the board. This gentleman addressed a circular to the proprietary containing charges of mismanagement against his brother directors and the officers of the company. Hence a special general meeting was requested and held to investigate these charges, and to inquire generally into the affairs of the company, which took place the 11th of February, at which a committee of four Manchester and four London proprietors was appointed, with full powers to make a most searching investigation into all matters relating to the company from its commencement to the present time, and to report thereon to the general meeting, held as above.

It affords us much pleasure to state, that the report of the committee (see our wrapper) was in the highest degree satisfactory to all concerned, and honourable to the directors and officers, as we felt confident it would be from our knowledge of the parties.

It will be recollected that this railway connects the Birmingham and Great Western Railway with the west-end of London, and with the Thames by means of the Kensington Canal, which is the property of the company; it also connects the Paddington Canal with the Thames, thereby deriving its traffic from the three most important feeders in England. A branch line to Knightsbridge is in contemplation, which, it is thought, would add very much to the passenger traffic. An immense traffic in goods cannot fail to pass over this short but important railway from the north and west of England, as the distance by water to the city wharfs is considerably less from the junction of the line with the Great Western and Birmingham than by land from the respective depots of these undertakings, and the expense of carriage would be very much reduced. An extension of the line to cross the river, and join the Southampton Railway at Vauxhall, is also talked of, and could, it appears, be constructed at a trifling cost.

A vote of confidence in the directors was carried by acclamation. Several proprietors also bore testimony in the strongest terms to the ability and zeal with which the affairs of the company had been conducted by the officers. It was stated that so confident are the directors of the success of the undertaking, that they have paid up the amount of their shares in full.

Bristol and Gloucester Extension Railway.—The application to Parliament has been suspended in consequence of the deficiency of the subscriptions, but the line is considered to be one of too much importance to be abandoned.

Deal Pier.—In answer to some inquiries made of us, we believe that the contract for the pier complete, has been taken at a sum under 14,000*l*. The length of the pier (which is to be very strongly built of wood) is 415 feet, the width 20 feet, and the breadth of the termination or square end 60 feet. The height above low water is 29 feet, and above high 12 feet. We shall have further particulars to communicate in our next. Sir John Rennie is the engineer.

Dublin and Drogheda Railway.—We understand that the directors of this company are in communication with government, and the result is expected to revive the spirits of the shareholders, and secure the formation of

the railway with increased activity. In consequence of this negotiation, all proceedings have, we understand, been stopped against the shareholders. This circumstance gives us the best hopes.—*Drogheda Argus*.

Edinburgh and Glasgow Railway.—This company held their general meeting Feb. 18th, but owing to some accident in putting the paper, the *Glasgow Argus*, in the post too late, as marked on it, containing the report, it did not reach us until the 25th, too late for our present number, in this short month. The report, which we purpose to give in our next, speaks well of the progress of the works and prospects of the company, and seems to have given entire satisfaction to the meeting. The company have given 50*l.* towards the survey of each of the lines, the east and west, into Scotland. It is expected the line will be completed in 1841. The total receipts have been 144,464*l.* 2*s.* 11*d.*, expenditure 68,569*l.* 2*s.* 8*d.*, leaving a balance of 75,895*l.* 0*s.* 3*d.* in hand. The expenses of obtaining the bill were 53,589*l.* 0*s.* 8*d.*, the company having been three sessions in Parliament.

Government and the Railways.—From the temper of the proceedings in the House of Commons on the 21st, as expressed by Mr. Gillon and Mr. Handley, it would appear that the conduct of the Birmingham Railway (which was obviously alluded to) had excited some strong feelings in the House. Extortion, tyranny, monopoly, and many other hard terms were employed. Mr. Spring Rice, Mr. Warburton, Mr. Hume, Mr. Easthope, and Sir R. Peel, gallantly defended the railways, and at length Mr. Gillon sounded his retreat, but snarled and growled a good deal. We recommend he should never have the honour to be made a railway director.

Great North Junction Railway.—In another part of our Journal appears a report of Mr. Blackmore, of his survey of a line from the Newcastle and Carlisle Railway, leaving it 20½ miles from Newcastle, and going *via* Bellingham, Melrose, &c. to Edinburgh. This line takes a very direct course, and the gradients are much better than we could have expected from the country. The length of the new line is 96 miles, making the total distance between Newcastle and Edinburgh 116½ miles. The great objection to an inland line to the Scotch capital has been the magnitude of the works, the badness of the gradients, and the immense length of tunneling. Mr. Blackmore's report describes the works generally of an easy description, the average gradient 18 feet a mile, and the length of the tunnel only 1½ mile; and he says the landowners are almost all favourable to the undertaking.

Grand Junction Railway.—This company held their general meeting Jan. 30th, at Liverpool, after our last was out, John Moss, Esq., in the chair. The report in another part of our Journal declared, as we stated it would, a dividend of 6 per cent. for the half year. It was stated that the best of feelings existed between the boards of the Liverpool and Manchester, Grand Junction, and Birmingham railways. Some discussion subsequently arose on the motion of Mr. A. F. Jones respecting the publishing of the accounts, which the chairman resisted under the plea that it was not prudent, but observed that any shareholder might inspect them at the company's offices in Lime-street. It seems the Fiddler's Ferry alteration which was to cost 250,000*l.* (see their report, vol. 3, p. 275) is abandoned, and they now intend to make a deviation from Hayton to Warrington, estimated, the chairman said, at 150,000*l.* This deviation will still avoid the three inclined planes and save 3 miles. The *Maintenance of Way*, has been contracted for at about 250*l.* per mile per annum. We sincerely rejoice at the prosperity of this company, but we confess we do not like the look of not publishing the accounts. If all is right and aboveboard why refuse to publish them?

Great Holyhead Railway.—In our advertising columns will be found a prospectus of a line surveyed by Mr. George Stephenson to Holyhead.

Mr. Stephenson says, he has surveyed the whole of North Wales, and finds this the best line for a railway communication. He says, there are no summits, and that the inclinations nowhere "exceed 16 feet a mile, and that only for a very short distance." Of course it must be a very favourable line. The length to be made will be about 82 miles, and the total distance from London to Holyhead by it, will be 259 miles *via* the Manchester and Birmingham Extension and Chester and Crewe railways. We quite agree with Mr. Stephenson, that the shorter the uncertain and more dangerous passage by sea is the better, and that Dublin is the one only point of communication to be sought for from England. That a good line for the exit will pay we feel quite certain, and most happy shall we be to see any such carried into execution.

Great Western Steamer.—Our accounts from America make heavy complaints of the accommodations of this vessel.

Great Western Railway.—The general meeting was held Feb. 12, in London, W. U. Sims, Esq. in the chair. This meeting was a very gratifying contrast to the one we had lately the pain to record. The greatest unanimity prevailed, and the northern gentlemen, Mr. Heyworth, Mr. Crosswaite, &c., did as gentlemen of respectability and sense, having a regard for the interest of the concern, would do, namely, cordially assisted the directors and threw out several useful hints. The chief points elicited from the questions of Mr. Heyworth, and the answers of the chairman and engineer, were, that the line would be opened as far as Twyford, by June 1st; that the expense of laying the permanent way would be from 6,000*l.* to 7,000*l.* per mile; that a revised estimate of the traffic would be taken; and that the average cost of the Great Western engines was 1,900*l.* An answer to Mr. Crosswaite by the engineer gave the time for opening to Swindon 18 months, or the summer of 1840. Mr. Parsons having asked what amount of capital it was intended to apply for, the chairman replied, it was in contemplation to issue half shares, and to raise one third more on loans, making in all 1,666,000*l.* and raising the total capital of the company to near 5,000,000*l.* On the motion of Mr. Vausley, seconded by Mr. Edwards, and supported by Mr. Heyworth, the whole of the retiring directors were re-elected. These friendly proceedings have naturally very much annoyed the "scaramouches of the Railway Times," and they have fallen foul with their usual overflowing measure of abuse on Mr. Heyworth and his friends. However, poor "scaramouches," we must make some allowance for them. Seeing their tricks and falsehoods discovered and despised, it is to be supposed they would be irritated. But there is also another cause. We have at last opened the eyes of the northern gentlemen to the health of their own dear milch cow the Eastern Counties, from which it is likely that "peculiar talents" may have to change the air and locality.

Glasgow and Ayr Railway.—The general meeting of this Company was held Feb. 7, at Glasgow, John Fleming, Esq., in the chair. The meeting was large and highly respectable, and the reports (in another part of our journal) of the directors, engineer, and committee of the joint-line having been read,

The CHAIRMAN rose, and congratulated the shareholders present on the progress which had been made in the prosecution of the undertaking. The report being so full, he would not detain them long by any remarks on the important subjects which it brought under their notice; but having lately been appointed, along with Mr. Brooks and Mr. Archibald Smith, as a committee of directors to visit the line, he thought it might be gratifying to them to know the result of their inspection. The state of the weather during this visit was fortunately such as to enable them to examine the works from one extremity of the line to the other, and it was highly gratify-

ing to see the efficient manner in which the operations were carried on. The line for the first fourteen miles from Ayr, as was known to the shareholders, was mostly through a light or sandy soil, and was consequently of easy execution; and from the way in which the embankments, though in many places considerable, were already consolidated, the permanent road would be laid in such a manner as to be afterwards cheaply maintained. A large portion was nearly finished, and it appeared almost a straight line, and no ascent on it was greater than one foot in a thousand, while the most of it was perfectly level. The terminus at Ayr resembled that at Glasgow in being close to the harbour and to the bridge over the river, which connected the different parts of the town and led to the centre of business. In going along the line from Ayr, the bridges, walls, and other masonry, struck him as being executed in a very superior and substantial manner. They are formed of a beautiful white compact freestone, very hard and durable, and their designs reflect great credit on the taste and skill of the engineer, whilst their execution does equal credit to the contractors. Upon the whole, he trusted that this railway would turn out to be as superior to any yet executed, in the efficiency and durability of the works as in the cheapness of its completion. They had just concluded the last of the contracts on the main line, and these, as well as all the others between Ayr and Paisley, provided, that there should be no extra charge for spoil banks, or ground beyond the line of the railway, and that the contractor should settle all such claims. The line was also estimated to be laid with heavy rails, and would no doubt be found durable in every respect. The rails from Paisley to Johnstone would be continued the same as the joint-line, or seventy-five pounds to the yard; and from Johnstone onwards, they would be sixty-five pounds to the yard. He would not detain them with any further remarks on the report, but if any gentleman had any question to propose, he would be glad to hear it, as it was the anxious wish of the directors to give the fullest explanation in their power regarding the proceedings.

Mr. WATSON said they had all been much gratified by the report which had been read, and he had no doubt the information it contained would give general satisfaction. But there was one point on which he required a little information. The cost of the line between Ayr and Paisley had been accurately stated in the report, but no definite information was there given of the cost between Glasgow and Paisley. Now, he would ask whether, after making ample allowance for that portion of the railway, the directors thought that the whole works from Glasgow to Ayr and Kilmarnock would be executed within the Parliamentary estimate, and if within it, what the saving would be?

The CHAIRMAN said that there were two reasons why he could not give any detailed information as to the cost of the line between Glasgow and Paisley. One was, that a considerable portion of the ground for the terminus in Glasgow had not yet been bought, and the arching in Tradeston was not contracted for. The other reason was, that the line between Glasgow and Paisley belonged equally to the Greenock Company, who were entitled to be consulted before any statement was made which could commit them. He did not see, therefore, how he could satisfy Mr. Watson's inquiry.

Mr. HUMFREY said he thought this might be safely answered without committing the Greenock Company. From a calculation which he had made, and which he held in his hand, he was warranted in saying that, after making a liberal allowance for the execution of the joint line, the whole of the work between Glasgow and Ayr and Kilmarnock *would be executed within the Parliamentary estimate.*

After some explanation by Mr. Miller and Mr. Bannatyne, Mr. LEAD-

BETTER observed that the report gave precise and accurate information as to the cost of 33½ miles out of the 40 between Glasgow and Ayr, and as to this part of the line they did not proceed on conjecture, *but on facts*, they might safely assume that it would be executed for an average of 11,000*l.* a mile, or 365,000*l.* The only part about which there could be any doubt, was the six or seven miles between Glasgow and Paisley, but in order to be secure, they might take 30,000*l.* per mile as the cost of these, including the terminus and depots, one-half of which was paid by the Greenock Company, so that if to the 365,000*l.* we add 105,000*l.*, it gives us 470,000*l.* Then the branch from Dalry to Kilmarnock was ten miles in length, and was formerly estimated at 100,000*l.*, but even assuming it at 120,000*l.*, which was certainly ample, it appeared that the whole line would come to 590,000*l.*, leaving 35,000*l.* for the small branches, to the Duke of Portland's harbour of Troon, and others which they had included in the estimate, and consequently the subscribed capital of 625,000*l.* would most certainly cover all expenses.

Mr. WATSON expressed himself perfectly satisfied with the explanations which had been given. He had, however, one important question to put. He observed it stated in the report that the directors had contributed a sum of money towards the survey of a line of railway from Kilmarnock or Ayr to Carlisle by Dumfries. Probably the chairman would have no objection to say what that sum was, and whether any other steps had been taken to promote the measure.

The CHAIRMAN said that the sum given was 100*l.*, and that a correspondence had been entered into with the landed proprietors, and other parties chiefly interested in the line.

Mr. WATSON said his object was to call attention to the necessity of adopting energetic measures to forward this great object. Public meetings had been held in Dumfries and other towns, but none as yet in Glasgow. If left to the Dumfries-shire gentlemen alone, the matter must fall to the ground. In Edinburgh and Newcastle, steps had already been taken to go to Parliament in 1840 for an East Coast line, whilst the merchants of Glasgow, who were so much interested in the formation of a West Coast line, to connect the neighbourhood of Glasgow with Lancashire, were resting with a good deal of apathy over the proposal. No great railway had yet been carried through by landed proprietors alone, unassisted by the wealth, enterprise, and weight of the commercial community, and he therefore trusted the directors would see the necessity of bringing the subject before a meeting of the inhabitants of Glasgow.

Mr. LEADBETTER said they were obliged to Mr. Watson for bringing the subject before them—some time ago a committee of directors, of which he was chairman, had been appointed to correspond with the parties on the line. It would be recollected that Mr. Humfrey, the secretary, had also attended the public meeting at Dumfries, and he might say that those and other measures were going on satisfactorily to forward the object in view. It was true, however, that the question had not yet been brought before the Glasgow public in the manner it deserved. But, that course would be adopted in a short time. The Lord Provost had already been written to by the Provost of Dumfries on the subject, and although no public meeting had been officially called, it would, he trusted, not be long before a numerous and influential one was held.

Mr. WATSON hoped the measure would not be lost sight of.

The resolutions were then put and severally passed, for which, see our wrapper.

Mr. WATSON was sorry to trouble the meeting again, but he held in his

hand the draft of a prospectus for establishing a Steam Navigation Company from the West Highlands and Islands of Scotland to the ports on the coast of Ayrshire and to Liverpool, for the conveyance of cattle, sheep, wool, and goods, both in the way of export and import, in which it was stated that "by a communication made with the Glasgow and Ayr Railway Company, the directors have, in furtherance of this object, engaged to provide trucks, or other approved carriages, as used on the Manchester and Liverpool Railway, for the conveyance of such cattle as may be landed at any port on the Ayrshire coast, to Paisley, Glasgow, &c., and intermediate places. It is not doubted that the directors of the Glasgow and Edinburgh Railway Company will do the same, and thus a ready and desirable mode of transport will be opened to the Falkirk, and other great cattle markets in the West of Scotland, and also for the supply of Edinburgh and Leith and adjacent country." Now, he understood it was projected some time ago to form a branch from the Edinburgh and Glasgow, and the Glasgow and Garnkirk Railways on the north side of the city, to join the Ayrshire Railway on the south side. By such communication, cattle and goods could be readily and conveniently carried from one side of the island to the other. The convenience would even be felt for the conveyance of cattle and goods more than for passengers. He would like therefore to know whether the directors had still the expediency of such a proposed junction line under consideration. He knew that the late Mr. Charles Tennent had urged it on the directors of the Edinburgh and Glasgow Railway Company; but the Ayrshire, the Garnkirk, and the Edinburgh and Glasgow Companies, were all interested, and the expense of a survey would be trifling when divided among them.

The CHAIRMAN said the subject had been repeatedly under the consideration both of the directors of the Ayrshire Railway and of the Edinburgh and Glasgow Railway. He thought it more particularly belonged to the Edinburgh and Glasgow Railway directors to take it up, as such a line, in addition to the connexion which it would give them with the Ayrshire and Greenock Railways, would afford to them an access to the harbour of Glasgow. He might say that he believed that the scheme was practicable, and he suggested that Mr. Watson would make a motion on the subject.

Mr. WATSON, in a few remarks, pointed out the advantages of proceeding early in the business, and moved that the directors be empowered to give a sum not exceeding 100*l.* for a survey of the proposed branch to unite the Edinburgh and Glasgow, and the Glasgow and Garnkirk Railway with the Ayrshire Railway.

Mr. LEADBETTER said the subject before them was one of importance. The practicability of the proposed line had been already ascertained by the levels, and it would connect so many railways together, as to make a survey of it a matter of easy execution, from the number of subscriptions which would be obtained from the different companies. He cordially seconded the motion, which was agreed to.

On a question by Mr. ANDERSON, as to the width of the railway adopted on this line, some conversation ensued, when it was explained that the common English width of 4 feet 8½ inches had been fixed upon, not as abstractedly the best, but as having been tested by the greatest length of experience, and as affording facilities for ultimately making connexion with the English lines at Carlisle.

Thanks were then voted to the Chairman, who stated that he hoped at next half-yearly meeting to give the shareholders a favourable report as to the traffic which would then be yielding revenue on 11 miles of their line.

It will be seen by the reports and the proceedings which we have

detailed at great length, that this meeting was one of the most searching and satisfactory railway meetings which we have for some time had the pleasure to record. The statement of the engineer, confirmed by the calculations of their able secretary, Mr. Humfrey, that the works, now so far advanced as to leave no doubt of the cost, would be completed within the Parliamentary estimate, gave great and unmixed satisfaction. We understand from an eye-witness that the works of this line are executed in a most substantial and beautiful manner. The buildings are all of stone, and the termini are laid out like those of the great lines in England. Though so substantially done, the works are executing at a very moderate expense. This arises from there being no jobbing, no sinecures; and above all, from having upright, skilful and indefatigable officers, especially in that important and responsible situation, the secretaryship. In our No. 35, we gave a neat map, and an account of this line, to which we beg to refer our readers for more particular information.

Glasgow, Paisley, and Greenock Railway.—Notwithstanding the frost, snow, and rain, the works have been carried on with great spirit and determination on this line. It appears from the statement of the resident engineer that 1,562 men are employed on the works, that two engines are at work, and a third engine is preparing, and that about 30,000 yards of rock have been excavated at Bishopton since the general meeting in December. The Finlayston contract is now thickly studded with hands, which are daily increasing, and the Walkingshaw works are commenced. At Bishopton the operations are principally carried on through whinstone rock; and Mr. Mackenzie, the contractor, is neglecting no point where power can be effectually applied. The consumption of gunpowder is very great.

—*Greenock Advertiser.*

Hull and Selby Railway.—The requisite preparations are making for carrying on the various works connected with this undertaking, with the utmost energy. As the favourable season is approaching, the directors are pressing the various contractors to use additional efforts, so that the works may be finished earlier, if possible, than the time limited by the contracts; and it is the intention of the directors frequently to go over the line, in order to observe, in person, the progress which is made. A part of the iron superstructure of the bridge to be erected over the river Ouse at Selby, has arrived there from the Butterley Iron Works, and will be put up forthwith. The report of the proceedings at the general meeting of the proprietors, held on the 1st February, which we give in another place, states the satisfactory progress making with the works generally, and also a very gratifying financial account; and we understand that, since the general meeting, some others of the proprietors have paid in advance the full amount of their shares. Of the fifth call of 5*l.* per share, due on the 13th February, upwards of 28,000*l.*, being nearly three-fourths of the full amount of it, were received within a week, and payments are daily being made on account of it; a more convincing proof of the respectability of the proprietary, and of their confidence in the undertaking, could not be afforded; a large portion of the amount required to be taken up on loan has been already advanced, and every prospect of the remainder being obtained without advertising for it. In order to show the increasing prosperity of the port of Hull, it will be sufficient to state, that the tonnage of vessels from foreign parts during the past year, amounted to two-sevenths of the like tonnage which entered the port of London. We are glad to hear that the shares are in great demand since the meeting, and at higher prices. If the name of Selby was sunk, and Leeds substituted, we are confident the line would be a much greater favourite with the public. Perhaps a finer

line, in an engineering point of view, there is scarcely anywhere, and the connexion contemplated with the Liverpool and Manchester, and Manchester and Leeds lines, will be of great advantage to it, as forming one unbroken railway communication across the country from Liverpool to Hull.

Harwich Railway.—This company, of which the prospectus is on our wrapper, have effected an arrangement for a junction, at Colchester, with the Eastern Counties Company, we believe on the following terms: namely, that for all passengers and goods brought by the Harwich Company to, or taken to the Harwich Company from, the Eastern Counties line, an allowance is to be made by the Eastern Counties to the Harwich, of 25 per cent. of the Eastern Counties maximum tolls for the distance run on the Eastern Counties line; the goods and passengers being carried by the latter company on their own line, and of course at their own expense. We are glad to find that the Government view the Harwich line favourably, because it is a proof of the importance of the measure in a national point of view. From the capacity, safety, and commodiousness of the Harwich harbour, it will be the means of greatly facilitating the communication with the north of Europe; and it is on this account, we presume, that the Ordnance, Woods and Forests, and Customs, through whose lands the line runs for a considerable distance, are assenting parties, and will afford every facility for carrying the undertaking out.

Horsham and Horley Railway.—A petition in favour of this line, which is creating considerable interest, is about to be got up, and, we doubt not, will be numerously and respectably signed, in spite of the threatened opposition to the line.—*Brighton Gazette.*

Irish Railways.—We are glad to hear that the subject of Irish railways is to be brought under the notice of Parliament on March 1st, by Lord Morpeth, but we wish it had been a week earlier. A very excellent letter on this subject appeared in "Freeman's Journal" of Feb. 7th, by Thos. Bermingham, Esq., addressed to James Dwyer, Esq. We regret our crowded pages will not allow us to give it, as it contains much useful and sensible matter on the subject of Irish railways. The petition, also, of the Great Leinster and Munster Railway Company, presented to the House Feb. 20th, shows, by several facts, the injury and injustice done to Ireland, and the private companies, by the commissioners' report, and proves, as we also have, the impossibility of the south-west line of the Commissioners ever being anything but a grievous injury to existing interests, and a failure as regards pay. We rejoice to see Irishmen thus bestirring themselves, and having the interests of their country so warmly at heart. We cannot understand upon what principle Mr. O'Connell is advocating the Commissioners' plans. If, as it has been observed to us, the Government make the railroads, will it not have the complete control of transit, and therefore be possessed of a most dangerous power in the time of elections? We fear the great agitator is advocating very dangerous measures for the liberties of his country. Let him beware what he is about.

We have received the map of the General Irish Railway Committee. It appears to be laid out with great judgment, but we must take time to consider it, and should like to know what the gradients, magnitude of the works, &c., are. We hope this committee, constituted as it is of men of sound judgment, will persevere in their great and high objects, and they must succeed. The public are looking forward with great anxiety for Lord Morpeth's measures.

London Grand Junction Railway.—Feb. 20th, this company held a general meeting; Wm. Cash, Esq., in the chair. The report stated that out of 62 persons in arrear, owing 3,256*l.* 10*s.*, they had received the arrears

from 35, amounting to 1,126*l.* 14*s.* 11*d.*; and that the present balance in hand was 3,452*l.* 2*s.* 5*d.* It was the wish of the directors to dissolve the company, but this was impossible. And it was therefore judged prudent to lie on their oars, and wait for what the chapter of accidents might turn up in their favour from the Birmingham Company.

Maintenance of Way.—A friend has handed to us the following comparison between a viaduct and an ordinary line. The Greenwich trains travel 64 journeys daily, each way, except on Sundays and fairs, when the number of journeys is much increased; the Liverpool and Manchester have 8 trains each way daily, we believe, and the annual expenses of maintaining the way appear to be about 300*l.* per mile. The number of Greenwich journeys per year, each way, is $365 \times 64 = 23,360$; or allowing for the increased number on Sundays, fairs, &c., full 25,000, or both ways 50,000. The whole expense of maintaining $3\frac{1}{2}$ miles per annum, with this traffic, has been 1,000*l.*, or 308*l.* per mile per annum. The Liverpool and Manchester line is said to have 8 trains each way daily, or $365 \times 8 \times 2 = 5,840$ per annum, both ways, or $\frac{1}{4}$ ths the number of the Greenwich journeys. Their annual expenses of the maintenance of way per mile is also about 300*l.* Multiplying this by $\frac{1}{4}$, gives 2,550*l.* for maintenance of way per mile per annum, the number of journeys being the same as on the Greenwich Railway, whereas the Greenwich costs only 308*l.*

Manchester and Birmingham Railway.—The contractor for the viaduct over the river Dane and Valley, at Congleton, having declined to fulfil the agreement, it has been again offered for competition, and been taken by Messrs. Bleakley, of Manchester, at 112,991*l.* It is calculated that it will contain about 630,000 cubic feet of stone, besides about 24,000,000 of bricks.—*Macclesfield Courier.*

Manchester and Birmingham Extension Railway.—The select committee on this company's Bill met on the morning of the 22d Feb.; Mr. Aglionby, chairman. It was stated by the agents, that there were four petitions complaining that the standing orders had not been complied with, and that one of the petitions contained no less than 382 objections. The committee-room was much crowded, and the inquiry is likely to be a very protracted one.—*Standard.*

Midland Counties Railway.—In this age of almost universal underestimates our readers will be glad, to hear that this important line is likely to form one of the rare exceptions, by being completed within the Parliamentary estimates. The works are proceeding very satisfactorily, and the shares have risen from 16 to 8 discount, and are still rising.

Newcastle and North Shields Railway.—The works on this line are now rapidly drawing to a conclusion, and it is expected to be opened to the public in the ensuing spring. The great viaducts over the Ouseburn and Willington Deans, are on the point of completion. The one at Willington Deans is now finished. It is composed of 13 arches, 9 of which are of wood and 4 of stone, with 2 massy buttresses, and is in length 1,050 feet. The height of the roadway of the main arch is 78 feet above the small stream running beneath it. The Ouseburn Dean viaduct will be finished shortly. It is composed of 9 arches, the 5 centre ones of wood are each 116 feet span, with 2 stone arches at each end, to throw the embankment from the breast of the hill. The height of the roadway of this bridge from the bed of the Ouseburn is 108 feet. The public are daily taking more interest in this railroad. The distance on this line is expected to be accomplished in 20 minutes, and it is understood to be the intention of the directors to fix the rates at as low a point, for the conveyance of passengers, as circumstances will warrant.—*Newcastle Journal.*

Northern and Eastern Railway.—The half-yearly general meeting of this company stands adjourned to March 19. Owing to the inability of the Eastern Counties to go beyond Colchester, the Norwich and Yarmouth traffic it is probable will be carried *via* Thetford, into this line at Cambridge. This would indeed be infinitely the best course for these places, as it would then give them a communication with the midland counties of England.

North Union Railway. Speed.—A friend of ours, who has lately travelled by the mail train on this railway, from Parkside, its connexion with the Liverpool and Manchester line, to Preston, 24 miles, says, they do it in 40 minutes the least, to 45 minutes the longest time, which is from 30 to 36 miles an hour, including a stoppage at Wigan. This is a fair railway speed.

North Midland Railway.—The general meeting was held in London, Feb. 8th; George Carr Glyn, Esq., in the chair. In opening the business of the day, the chairman dwelt on the uncommon rapidity with which the works were proceeding, and had no doubt that the whole line would be opened for traffic next year. Having alluded to the intention of the directors to apply for powers to raise an additional sum of money, and to some sources of revenue not taken into account in their estimation of traffic, because they were anxious to keep within rather than to exceed the limits, he mentioned a determination of the directors to throw the line open without prejudice or partiality to all carriers, the company reserving to themselves the power of carrying on their own account should there arise any combination among the carriers to the prejudice of the public. We must here beg to pay the tribute of our cordial approbation of this proper and noble line of conduct. If every company were to do the same, we should hear but few complaints. H. Patteson, Esq., having read the report (see our reports), the retiring directors, on the motion of — Childers, Esq., M.P., seconded by — Chambers, Esq., were unanimously re-elected. In answer to a question of how far the Manchester and Leeds railway would run on the North Midland, the engineer replied, about 10 miles. A proprietor having asked the question when another call would be made, the chairman replied, that owing to the rapidity with which the works were proceeding, probably during the present quarter. A reference was then made to the amount of new capital that would be required, when the chairman answered, 500,000*l.* together with some additional debentures, the exact amount of which was not determined. On the motion of Lieut.-Col. Norcliffe, who paid some high compliments to the chairman, a handsome vote of thanks was carried to the chairman and directors, with an amendment to it, by Mr. Parsons, including the engineer. The business of the day then concluded.

Newcastle and Carlisle Railway.—The directors of this company have just given notice of their intention to apply to Parliament for an Act to authorize them to deviate in many respects from the original line of the railway, and adopt lines instead of it, and to confirm other deviations already made. The principal powers sought are to make a deviation or substitution line in the White Well Field, in the township of Elswick, terminating at the east side of the lane leading from Scotswood-road to the Lead Factory Quay; and to make a branch railway, commencing at "the head of Water Works Ravine, and terminating in the line of railway mentioned in the first Act authorized to be made."—*Tyne Mercury.*

We understand that the revenue of the company is such as to induce the directors to recommend to the shareholders, at the annual meeting in March next, to discharge the debentures given for interest to the share-

holders, and to declare a dividend of 4*l.* per share, to be paid in the course of the present year.—*Carlisle Patriot*.

North Midland Railway.—[Compensation Case]: The River Dun Company claimed for the value of land required for the above railway. They had formerly obtained an injunction to restrain the railway company, but now they have agreed to accept the sum offered by the latter.

Publication of Railway Accounts.—We hope the Legislature will take some measures to insist on the fullest publication of the companies' accounts half-yearly. It is the only way to inform the public and distant shareholders of their true situation, and prevent fraud should any bad persons get possession of the management. Respectable companies have nothing to fear from it; on the contrary, they will be greatly benefited, while the bad will be checked in their career *in limine*.

Railway Reports.—We are aware that in the progress of works pretty full reports are needful for the satisfaction of the proprietors, but we think in the accounts there can be no excuse for confusion or obscurity. It is with pain we feel ourselves bound to find fault with the obscurity, prolixity, and superfluous divisions of the Birmingham accounts. We have heard repeated complaints of it. No doubt it was done from good intentions to afford full information, but whoever is the author of it, we must beg leave to tell him he has accounts to learn. The Great Western is infinitely better. It goes on the plan of the Liverpool and Manchester, which is a model for railway reports. Many thanks, however, are due to the Great Western and Birmingham for the information they are affording the railways.

South-Eastern Railway.—It is intended to erect a sea-wall of concrete nearly one mile in length and about fifty feet in height, along the face of the cliff west of the Shakspeare-tunnel at Dover, to the commencement of the Abbotscliff Tunnel near Lydden-spout.

Southampton Railway.—We are glad to find that the directors have ordered that the midday train, which passes Kingston about one o'clock, is to stop there for passengers in future. Till now there were six hours in the middle of the day without any opportunity of going by a train either to or from Kingston.—*West Kent Guardian*.

Thames Haven Dock Railway.—This company, we see, has given its notices to come straight into the metropolis, by which we suppose no chance exists of any arrangement with the Eastern Counties Company. We understand that the new coal company, in course of formation, is in connexion with the Thames Haven Company, both for a depot at the dock and a cheap carriage into London. A powerful steam navigation company is also, we hear, coming out (of which we have seen a prospectus), which will be a great adjunct to the Thames Haven Company.

York and North Midland Railway.—By some means the paper containing the proceedings and report of this company, January 14th, has not reached us, and the one the secretary has kindly sent in its stead did not come to hand until the middle of the 25th, when that part of our journal containing the reports had been closed. The report shall, however, appear in our next. It gives a full and gratifying account of the proceedings and position of the company. The Lord Mayor of York presided, and the meeting was "very numerously attended by the principal gentry, merchants, and bankers of the city, who are shareholders," and take a great interest in the undertaking. According to the balance-sheet, 123,453*l.* 17*s.* 2*d.* have been received, and 97,950*l.* 2*s.* 5*d.* expended, leaving a balance of 25,503*l.* 14*s.* 9*d.*

Strenuous exertions are now making to complete that part of the line

near York. Five or six large fires are kept burning during the night, by the light of which the excavators are employed in lowering the rampart and levelling the road through the Bar-walls work. The part of the walls pulled down is to be replaced by an ornamental iron-bridge to be erected across the opening. Plans of the structure were laid before the Philosophical Society at their late meeting, and received their most decided approval.—*Leeds Mercury*.

INSTITUTION OF CIVIL ENGINEERS.

May 8, 1838.—The PRESIDENT in the chair.

George Tremenhoe, Lieut. Bengal Engineers, and W. S. Inman, were elected associates; and Professor Willis an honorary member.

On Huddart's Rope Machinery. By E. Birch.—In this communication the author has described the general mode of manufacture, prior to the improvements introduced by Captain Huddart, and the establishment of the works at Limehouse.

It is accompanied by fifteen sheets of drawings of the machinery.

On the relative Heating Powers of Coke and Coal in Melting Glass. By Apaley Pellatt, Assoc. Inst. C. E.—The object of this paper is to confirm some statements of Mr. Parkes,* as to the calorific power of coke and coal from experience of the author's in melting glass. The great loss of heat arising from the flame and unconsumed gaseous portions of the fuel being driven up the flues, when the furnaces are heated by coal, and the fact that coke succeeds better than coal in annealing glass, determined the author to persevere for a month in heating the furnaces with coke, and to compare the result with those obtained when the best coal was employed.

The construction of the furnace and the arrangement of the pots and flues are described. The furnace is somewhat reverberatory, being between an air furnace and an oven; the smoke and flame not escaping at the top, but being drawn to flues betwixt the pots, which are set round in a circle. For the purpose of obtaining sufficient heat about the points and sides of the pots, there are small holes, called "bye-holes," through which the flames should play outward in a length of 5 or 8 inches. The healthful action of the furnace is indicated by the length of the flame issuing from the bye-holes and tops of the flues. Great care is requisite in regulating the supply of air, too much air endangering the pots, too little checking the heat of the furnace. The bars were obliged to be placed at 2 inches apart instead of $1\frac{1}{2}$; the greater concentrated heat of the coke not only requiring more air, but having a tendency to melt the bars; lumps of fire-brick also were thrown in to supply the deficiency of clinkers. To make, however, the flues and bye-holes draw well, it was necessary to use 1-5th of screened coals with 4-5ths of good coke, by measure. The following is the result:—For nine months the consumption of coals for a 7-pot furnace was 18 tons per week. For four months, on the new system, the consumption was $10\frac{1}{4}$ tons of coke, and 5 tons of screened coals per week. Deducting, then, these 5 tons, it appears that $10\frac{1}{4}$ tons of coke are of the same value as 13 tons of coal, or there is a saving of near 20 per cent. in the weight of fuel, and a superiority of 25 per cent. in the heating power of coke above that of coal. Considerable advantage is also derived from the saving of the pots, and in other incidents peculiar to the manufacture of glass.

Mr. Parkes observed, that the preceding statements had more than confirmed his results. From the statements of Mr. Pambour, on whose data his

* See "Minutes," p. 19, March 6, Session 1838.

calculations had been founded, it appeared that gas coke was inferior to Worsley coke by $12\frac{1}{2}$ per cent.; in his reasonings he had allowed 20 per cent. as the difference betwixt good coke and coal; but according to the results given by Mr. Pellatt, that allowance ought to be $32\frac{1}{2}$ per cent. He was of opinion that the advantage to be ascribed to the screenings was part chemical and part mechanical. The coal would fill up the interstices of the coke, and prevent the air from escaping unconsumed.

Mr. Pellatt remarked, that the safety of the pots was a very important consideration. By the terms hard and soft coke, he understood foundry and gas coke; the former gave a much more intense heat, and lasted longer. The coke he had used was gas coke, and about 14 cwt. to the chaldron. Mr. Fox stated, that the coke in use on the London and Birmingham Railway is about the same weight. It was stated, that coal which lost $\frac{1}{4}$ in weight, gained $\frac{1}{4}$ in bulk by coking.

PARLIAMENTARY PROCEEDINGS.

HOUSE OF COMMONS.

PRIVATE BILLS.—Feb. 6, “Resolved, that no petition be received after Feb. 22; no Bill read 1st time after March 18; and no report on such Bills be received after June 10.

BALLOCHNEY RAILWAY, petition presented and referred to Select Committee, Feb. 12.—**BISHOP AUCKLAND, AND WEARDALE**, pet. pres. and ref., Feb. 22.—**BIRMINGHAM AND GLOUCESTER**, pet. pres. and ref., Feb. 21.—**BRISTOL AND GLOUCESTER**, pet. pres. and ref., Feb. 21.—**CELLDRIDGE AND MULLINGAR**, pet. for enlarging the time to present a petition for a Bill, ref., Feb. 20.—**COMMERCIAL (LONDON AND BLACKWALL)**, pet. pres. and ref., Feb. 14; pet. complaining of non-compliance with the standing orders, ref., Feb. 20.—**CROYDON, MERSTHAM, AND GODSTONE IRON RAILWAY**, pet. pres. and ref., Feb. 21.—**DEAN FOREST**, pet. pres. and ref., Feb. 19.—**DEPTFORD PIER JUNCTION**, to amend Act, pet. pres. and ref., Feb. 22.—**EDINBURGH, LEITH, AND NEWHAVEN**, pet. pres. Feb. 19.—**GREAT NORTH OF ENGLAND**, pet. pres. and ref., Feb. 18.—**GREAT WESTERN**, pet. pres. and ref., Feb. 14.—**LIVERPOOL AND MANCHESTER EXTENSION**, pet. pres. and ref., Feb. 14.—**LONDON AND BIRMINGHAM**, Feb. 8, pet. pres. and ref.; Feb. 21, reported, and Bill ordered to be brought in by Mr. Dugdale and Sir Eardley Wilmot; Feb. 22, presented and read 1st; to be read 2d. **LONDON AND CROYDON**, pet. pres. and ref., Feb. 19.—**LONDON AND GREENWICH**, pet. pres. and ref., Feb. 21.—**LONDON AND SOUTHAMPTON (Guildford branch)**, pet. pres. and ref., Feb. 22.—**LONDON AND SOUTHAMPTON (Portsmouth branch)**, pet. pres., Feb. 6; ref., Feb. 8; report, and ref. to Standing Orders, Feb. 19; report from the select committee, Feb. 22, read; Bill ordered to be brought in by Mr. Shaw Lefevre and Mr. Mackinnon; pres. and read 1st, Feb. 25, and to be read 2d.—**MANCHESTER AND BIRMINGHAM**, pet. pres. and ref., Feb. 18.—**MANCHESTER AND BIRMINGHAM EXTENSION (Stone to Rugby)**, pet. pres. and ref., Feb. 11; Feb. 8, petitions complaining of non-compliance with the standing orders, from owners and occupiers of land in Stone and Rugby; proprietors of the Birmingham Canal; company of proprietors of the navigation from the Trent to the Mersey; trustees of the Stratford charities; and Sir Geo. Chetwynd, Bart.; ref. to select committee.—**MANCHESTER AND LEEDS**, pet. pres. and ref., July 18; petitions against, for non-compliance with standing orders, from Henry Taylor and Joseph Jones, Esqrs., ref., Feb. 25.—

MONKLAND AND KIRKINTILLOCH, pet. pres., Feb. 12.—NORTHERN AND EASTERN (No. 1), pet. pres. and ref., Feb. 22.—NORTHERN AND EASTERN (No. 2), pet. pres. and ref., Feb. 22.—NORTH MIDLAND, pet. pres. and ref., Feb. 11.—NORTH UNION, pet. pres. and ref., Feb. 22.—NEWCASTLE-UPON-TYNE AND NORTH SHIELDS (Tynemouth) EXTENSION, pet. pres. and ref., Feb. 18. PRESTON AND WYRE RAILWAY AND WYRE DOCK, pet. pres. and ref., Feb. 21.—PRESTON AND WYRE RAILWAY, pet. pres., Feb. 6; ref. Feb. 8; rep., and Bill ordered to be brought in by Sir Hesketh Fleetwood and Mr. Wilson Patten, Feb. 19.—RAILROADS (Ireland), return Feb. 12, ordered "in detail, under separate heads, of the expenditure by the commission in Ireland on the subject of railroads in that country, stating the name of every person employed, and in what capacity employed, who received more than 100*l.* as salary or pay for the services performed; stating also the period of such services;" pet. of the Great Leinster and Munster Railway Company, Feb. 20, complaining of certain statements affecting that railway in the report of the commissioners on railways in Ireland; to lie on the table, and be printed: pet. of landowners and others, Feb. 21, of the four provinces in Ireland interested in the construction of railways, for the appointment of a committee to determine, impartially, the best line; to lie on the table. REPORT OF COMMISSIONERS, Feb. 22 [pres. 20th March, 1837, and 27th July, 1838], read (Queen's recommendation signified), committee thereupon on Friday next; copies ordered "of all resolutions and memorials presented to the Lord-Lieutenant or Chief Secretary of Ireland, or to the Chancellor of the Exchequer, respecting railroads in that country: pet. from Ballyshannon in favour of the commissioners' plan.—RAILWAY AND STAGE-CARRIAGES, return ordered "of the mileage and composition for duties on railway and stage-carriages respectively, in the years ended the 5th Jan. 1837, 1838, 1839," Feb. 15; returns pres. to lie on the table, Feb. 18; return to be printed, Feb. 19.—SLAMANNAN, pet. pres. and ref., Feb. 12.—SOUTH-EASTERN DOVER, pet. pres. and ref., Feb. 11; deviation, pet. pres. and ref., Feb. 22; pet. for Bill ref. Feb. 26, and ordered to be brought in by Mr. Hodges and Mr. Ed. Rice.—WEST DURHAM, pet. pres. and ref., Feb. 21.—WISHAW AND COLTNESS, pet. pres. Feb. 12.

EASTERN COUNTIES RAILWAY GENERAL MEETING,

Held in London, Feb. 26, HENRY BOSANQUET, Esq., in the chair.

After the report was read, a rather stormy discussion arose respecting the scratching out of the ex-directors. It was contended by several proprietors that it was an illegal proceeding, and that no act of the directors done under it could be valid. The chairman said they had taken an eminent legal opinion on it, which pronounced in its favour. Other opinions, however, of equal authority were produced decidedly opposite. The solicitor, Mr. Duncan, gave his opinion in favour of the measure, but admitted, in answer to Mr. Cobbold, that the ballot would have been unexceptionable. One proprietor, who was a solicitor, expressed himself in strong terms against it; and moved to have the meeting adjourned to take the Solicitor and Attorney-General's opinions thereon. Great confusion followed. It was asked, if the directors were wrong, whether all their acts would not be invalid; Mr. Duncan replied, of course, but thought the directors might ballot as they liked, and said if wrong was done to any one he may have his remedy afterwards. Mr. Leathes, an ex-director, considered the scratching an insult, and would not sit at the board after being scratched out.

On the motion that Sir Robert Alexander, one of the ex-directors, and five Liverpool gentlemen be elected, a strong discussion arose. Several other gentlemen were proposed, some of whom refused to stand. A most personal attack was made on Mr. Hall, a highly respectable gentleman, of Liverpool, an ex-director, and it was stated, from a paper handed about, that his expenses had cost for every day's attendance upwards of 16*l*. Mr. Hall replied in a most satisfactory manner, and said, that the paper handed about was, he doubted not, as full of errors as others from the same quarter, the office. The chairman, Mr. Gibbes, a director, and others, bore strong testimony to the invaluable services rendered by Mr. Hall to the company, and considered the expenses as a mere drop in a bucket of water compared to the value of his services. The directors evidently leant in favour of the election of Liverpool gentlemen, convinced of the immense assistance they would render the concern, from their great practical knowledge of railways. At length Dr. Chevallier, demanded a ballot, and Mr. Hall and Mr. J. G. Hamilton were appointed scrutineers. During the time the scrutineers were out, some discussion arose about the bankers having refused to take the money of a shareholder unless the call-paper was produced, notwithstanding the secretary had informed him that its production was not necessary. The proprietor said, his brother, 270 miles off, had not received the call-paper, dated a month before, until the payment was due. Others made similar complaints, to all of which irregularities, the secretary made some observations, unsatisfactory and indeed quite unintelligible to us. Two of the by-laws were repealed; one of them was, that the seat of any director who was absent for 8 consecutive meetings should be vacated. The seal of the company was affixed to the agreement with the Northern and Eastern Company.

The report spoke of course highly favourably of the progress of the works, and of the tilting machines for the earthwork. It stated that every exertion was making to bring the works up to Shoreditch, 2½ miles of which, land and houses, would cost (as far as we could catch the words) 206,000*l*., of which 122,000*l*. remain to be paid, but unluckily they wanted to raise 533,333*l*. on loan, in addition to the calls. This the meeting afterwards authorized to be done. It was determined to print and circulate the reports, but the balance-sheet, which appeared to our reporter to be in a state of great confusion, the chairman said, must be sent (*mirabile dictu*) to an eminent accountant employed by them to be revised. This it seems was very prudent, for on inspecting the figures in the report, it appears that a trifling mistake had found its way in. Instead of 533,000*l*. to be raised, it was written, perhaps having a prophetic view to their real wants, 5,333,000*l*. The arrears—on the 1st call, are 1,613*l*. 3*s*. 9*d*.; on the 2d, 2,922*l*.; on the 3d, 8,272*l*.; on the 4th, 31,400*l*. 10*s*.; on the 5th, 49,873*l*. 10*s*.; and on the 6th, 104,928*l*.; making a total of 199,009*l*. 3*s*. 9*d*. The newly-elected directors are, Sir Robert Alexander, Bart., Mr. Robert Mather, Mr. David Hodgson, Mr. Robert Crosbie, Mr. Daniel Mather, Gentleman, Richard Harrison, Esq.

London and Horsham Railway, commences at the 17th mile stone of the London and Brighton Railway, in the parish of Herley, and runs through Charlwood, Crawley, Ifield, Beeding, and Rusper, and terminates in the town of Horsham, being ten miles in length. The gradients are said to be favourable, the steepest being 16 feet in a mile, and the works light; the deepest cutting not exceeding 24 feet, and the heaviest embankment not higher than 30 feet; these only occur in one place. For several miles the line runs upon the surface of the ground. Capital, 200,000*l*., divided into 10,000*l*. shares of 20*l*. each.

PRICES OF RAILWAY SHARES.

Those finished are marked (1); in progress (2); which have their Bills, but are not begun (3); others (4).

NAMES OF RAILWAYS.	No. of Shares.	Share.	Paid.	Prices sold at.			Dividend per Cent.
				High est.	Low est.	Latest Price.	
(2) Birmingham and Derby . . .	6,300	100	£. 60	50	50	50	
(2) Birmingham and Gloucester . .	9,500	100	40	24½	24	24½	
(2) Birm., Brist., & Thames Junc. .	7,500	20	15	...	...	9	
(2) § Bristol and Exeter	15,000	100	20	11	9½	10	
(2) § Cheltenham and Great Western	7,500	100	20	3½	3	3	
(2)* Chester and Crewe	5,000	50	25	25½	15½	25½	
(2)* Do., Birkenhead	5,000	50	25	35½	33½	35½	
(2) Commercial, Blackwall	24,000	25	9	7½	7½	7½	
(2)* Dublin and Drogheda	6,000	100	10	7	7	7	
(2) Eastern Counties	64,000	25	13	11½	11	11	
(2)* Edinburgh and Glasgow (old)	18,000	50	10	9	8½	9	
Ditto, ditto (new)	5,000	...	5	..	..	4	
(2) Edinburgh, Leith, & Newhaven	5,000	20	7	...	...	4	
(2)* Glasgow, Paisley, and Greenock	16,000	25	8	8½	7½	8½	
(2)* Glasgow, Paisley, and Ayrshire	12,500	50	15	7½	7½	7½	
(1)* Grand Junction (ex. div.) . . .	11,400	100	100	207	204	204½	12
(3)* Great Leinster and Munster . .	8,000	100	5	..	..	1	
(2)* Great North of England . . .	10,000	100	30	18	18	18	
(2) Great Western	25,600	100	65	79	76½	78	
(4) Harwich	11,000	20	1	...	...	½	
(2) Hull and Selby	8,000	50	25	15	9	15	
(2) Llanelly Railway and Dock Company	2,000	100	70	..	..	70	7½
(1)* Liverpool and Manchester . . .	7,968½	100	100	204	203	204	10
Ditto ¼ shares	546	25	25	49	47½	47½	
Ditto ½ shares	7,968	50	50	77	72½	77	
(1)* Leicester and Swannington . .	1,500	50	50	75½	75½	75½	8
(2) London and Brighton	36,000	50	17	13½	9½	12½	
(1) Do. and Birmingham	25,000	100	90	175½	166	170	
Do. ¼ Shares	25,000	25	5	31	29½	30½	
Do. Bonds, 5 per Cent. 1843. . .	...	...	20	...	...	...
(1) Do. and Greenwich	20,000	20	20	17½	16½	17½	3
Do. New Shares . . . . .	...	...	20	19½	19½	19½	
(2) Do. and Southampton	20,000	50	50	45½	41½	44½	
Do. do. New	16,000	25	20	40	40	40	
(2) Do. and Croydon, Trunk	20,000	30	16½	13	12	12½	
Do. New Scrip	6,666	20	10½	6½	5½	6½	
(1) Leeds and Selby	2,100	100	100	..	..	68	
(2)* Manchester and Birmingham	30,000	70	15	15	14½	14½	
(4)* Do. and Do. Extension	15,000	70	7	7	5½	5½	
(2)* Do. and Leeds	13,000	100	50	68½	68½	68½	
(2)† Do. and Sheffield	7,000	100	7½	3½	3½	3½	
(2) Maryport and Carlisle	4,000	50	17	...	...	...
(2)* Midland Counties	10,000	100	60	52	52	52	
(1)* Newcastle and Carlisle	6,000	100	100	..	..	92½	
Ditto ¼ shares . . . . .	...	25	25	..	...	23½	
(2) Northern and Eastern	12,000	100	15	5	5	5	
(2) North Midland	15,000	100	55	55½	55	55½	
(1)* North Union	3,200	100	100	70½	70½	70½	
Do. New Shares	3,200	50	50	..	..	64½	
(2) Preston and Wyre	2,600	50	44	...	...	42	
(2)* South-Eastern and Dover . . .	28,000	50	9	3	2	2	
(1) St. Helen's, Runcorn Gap. . . . .	...	...	100	..	..	40½	
(1) Stockton and Darlington . . .	1,000	100	100	...	...	...
(2) Thames Haven	9,000	50	5	..	...	4½	
(2)* York and North Midland . . .	6,700	50	20	20½	20½	20½	

* Those with a * are the Liverpool prices, which are to the 23d inclusive. † Scotch. ‡ Manchester. § Bristol. The others are London prices to the 25th.

THE RAILWAY MAGAZINE;

AND
CIVIL ENGINEERS' REGISTER.

No. XXXVIII.

APRIL, 1839.

NEW SERIES.

Irish Railways and Commissioners' South-Western Line. By the EDITOR.

THE first of March was distinguished by the development of Lord Morpeth's plan, in the House of Commons, for following out the commissioners' report. Previous to Lord Morpeth opening his case, Mr. Lucas exposed the jealousy and suspicion with which the commission was regarded in Ireland, and stated instances of unjust reasoning and application of principles by the commissioners with regard to the Great Central Railway. Lord Morpeth's project is to authorize two and a-half millions of Exchequer bills to be applied to construct the commissioners' line from Dublin to Cork, and Limerick, by way of a first experiment. The management is to be entrusted to the Board of Works, assisted by the Treasury. Out of the profits (the losses?) of this line, $3\frac{1}{2}$ per cent. interest is to be paid for the capital, 1, or $1\frac{1}{2}$ per cent. towards liquidating the debt, and the residue towards diminishing the rates. In case of deficiency of profits, the Noble Lord, to gild the pill the better for English palates, proposed that the adjacent baronies should pay one-third, and the counties comprehending them the remaining two-thirds of the deficient interest, and 1, or $1\frac{1}{2}$ per cent. of liquidation. Sir Robert Peel ably exposed the absurdity of the scheme, and its injustice towards the rest of Ireland. "If," said the Honourable Baronet, "these railroads were likely to turn out profitable speculations, why not leave them to the spontaneous exertions of the landowners and capitalists of Ireland? If they were likely to turn out unprofitable, let them consider the unfairness of what they were about to do towards the rest of Ireland and other capital employed." Even Mr. O'Connell disapproved of this partial system. However, the resolution was ultimately carried by 144 to 100.

Notwithstanding this vile attempt at jobbing away, on a most irrational and preposterous scheme, millions of English capital, we do not despair yet of its being defeated. Hitherto our money has been squandered on Government Irish jobs by thousands, every one of which is a miserable failure, having "large debts, scarcely any dividends, and overwhelming difficulties"—says Mr. George Lewis Smyth, in his letter to Lord Duncannon, on Railways and Public Works in Ireland, p. 57—yet we are now to begin a new era of extravagance, not with thousands, or tens of thousands, but with millions. Every legislator, and every one who takes an interest in the welfare of England, or Ireland, should read this little work. A more lamentable picture of the baneful effects of Government interference is not to be imagined. Not one single work undertaken by the Government, or in which it has interfered, but has most wretchedly failed, while those left to private enterprise have generally succeeded. Will our representatives, with such examples before them, be so regardless of our interests as to put it in the power of Government to tax this country to an unlimited extent, to pursue, *ad libitum*, its follies in Ireland? As to any repayment to us, it is perfectly ridiculous; it is a downright insult to common sense. When did such a thing ever happen? Give us but one case, and we should say, Take as much as you like. Will they instance the Royal Canal, laid out with such consummate folly as to run parallel to the Grand Canal, and having a nominal capital of only 300,000*l.*, while the Government advances are 411,500*l.*, and other loans 862,000*l.*, and the profit, says Mr. Smyth, only 13,236*l.*? Or will they take the Grand Caledonian Canal in Scotland, on which Mr. Smyth states that nearly 1½ million has been expended, whose "gross annual receipts have never exceeded 2,500*l.*," while its repairs amount to 3,000*l.*, and on which we must now lay out 150,000*l.* in repairing, or in destroying it; for it has the delightful peculiarity, that if neither repaired or destroyed, whole districts full of property will be inundated and ruined?

We hope our representatives will do their duty, and put at once an extinguisher on this infamous concoction of a new scheme of plunder for the benefit of a few, and the real injury of both countries. If not, it will be the duty of the people of England to shower in petitions from one end of the kingdom to the other, expressive of their indignant disapprobation.

Where are our English railroad companies, with an influence sufficient at any time to turn the tables? Are they

sleeping? They are as much interested as any parties. Let the Government but once get a footing as railway directors, and it will soon find means to take from our companies, one by one, the fruits of their enterprise and industry, wherever they are worth having. We will give them, by anticipation, the sketch of a preamble of a bill for the purpose:—
“Whereas it is highly expedient for the convenience of Her Majesty’s subjects and the despatch of business, that every possible facility should be given to a rapid unbroken transit, which never can be so well effected if parts of the road are under different governments as when united under one system; and whereas there is no body so fit to be entrusted with the control of the great public ways as the Government of the country; and whereas the profits of these roads would very much conduce to diminish the burthens of taxation, be it therefore enacted, that the railroads now in operation, known by the names of the London and Birmingham, the Grand Junction, the Liverpool and Manchester, the Great Western, &c. Railways, shall henceforward become the property of the State, and be subject to its exclusive control and management, the proprietors thereof being paid the cost of the said works, with bonuses of one or two per cent. (as Her Majesty’s ministers in the fulness of their generosity may see fit), to reward them for their virtuous enterprise.”
A preamble of this sort would sound exceedingly well abroad and to the enemies of railroads, but we doubt how far it would be grateful to the individuals who have risked their money for years, without fee or reward, in the hopes of a comfortable return hereafter. If they do not wish to see things come to such a pass, let them now bestir themselves, and nip this insidious attempt in the bud.

Indeed, it is as much the interest of the public as it is of the companies to keep the fingers of the Government from the railroads. While they are in the hands of private companies, the dread of rivalry and competing lines will always be a check on them; and we well know it is more easy to cope with the members in detail, than it is with the whole corporate body. Let the Government take them in hand, and it will be the worst thing that ever was done to the trade of this country; it will be another Post-office job, and infinitely worse. Like the mails, they will be amongst the slowest of conveyances, and fares will be stretched to their utmost tension. Dare we to complain, we shall have some smooth-faced Chancellor of the Exchequer telling us they cannot increase the speed, and it is impossible to lower the

fares, because the public revenue will not bear it. Besides, to permit Government to have the dominion of our roads and means of conveyance, will be next to a total surrender of our liberties, and will be giving the Executive a power worse than that of the most despotic tyrants of ancient or modern times. What would prevent the Government then from controlling your motions almost as it pleased? What could hinder it from carrying the elections how it liked; and, of course, reducing us to a state little short of absolute slavery? Better by far will it be for us to surrender the keys of our houses—for it will be some merit voluntarily to do it—and obtain from our lordly masters the hours they may please to permit us to go out and come into them.

This infamous Irish job, we repeat, is a more serious question for all parties than it at first appears to be. Our legislators, railway directors, and the public should look well to it. We shall have done our duty in warning them of the consequences; let them now do their's in destroying at once the possibility of them.

As Sir Robert Peel says, we do not object to the 2½ millions, if it was to stop there, and for the benefit of Ireland. But on the plan in which it is proposed to lay it out, it will be so much expended for its direct and positive injury. We believe the Chief Commissioner, Sir John Burgoyne, has admitted that if he was going to lay out only 75 miles of railway in Ireland, he could not have chosen a better than the Dublin and Kilkenny, as projected by Mr. Harte, the Secretary. And the commissioners in their report, acknowledge that this line "is laid out with great judgment." Why is it? because it is a line with light works; excellent gradients; running through populous places; keeping the natural line of the present traffic; injuring no property, but doing incalculable good to much; presenting the easiest facilities for lines to other places, and therefore, in every way desirable and likely to be exceedingly profitable. Can the smallest fraction of this be said of the commissioners' south-western line? Certainly not. If we are to judge by the estimates and country through which it goes, the works must be much heavier, and the gradients, even before they were deteriorated by the last alteration of the commissioners, were much worse than those of the Dublin and Kilkenny Company's line. Instead of being useful, it would be most pernicious, by turning as we have shown in our last the traffic out of its usual courses. And the misfortune is, there would be no

counterbalancing benefit. For of what utility would it be to bogs and wilds, to have trains whirling through them 20 miles an hour? In fact the line of the commissioners seems to have been laid down with a view to avoid as much as possible the populous and trading parts; and had a course been chosen to damage them the most, we doubt whether mischief itself could have devised a better.

As we have shown p. 130, vol. 4, Railway Magazine, the number of passengers which travel right through the Grand Junction line, 97½ miles long, is only 53 per cent. of the number that started, or that is travelling on any part of the line. For a line 100 miles long, we may take it in round numbers at ½ or 50 per cent. The remainder is made up of passengers belonging to shorter distances. As the distance increases, the number going right through diminishes, while *cæteris paribus* the number travelling on any part of the road is the same. This fact, as we have mentioned in our last, has been entirely overlooked by the commissioners; and hence a great and fatal error in their system. Had such a mistake been made in England, so thickly studded with towns, that if one is missed you must generally fall upon another, it would have been serious; but in Ireland, where by the commissioners' own documents all the business and population lie near the coast, and where the great bulk of travellers consists of men of business going only in their avocations from town to town,—to leave those places and to wander through wilds and deserts, is superlatively absurd and eminently destructive.

Under the circumstances it is doubtful whether one-fifth of the travellers going on any part of the line between Dublin and Cork, and one-fourth of those between Dublin and Limerick, go the whole distance at once; but we will assume one-fourth in the former case, and one-third in the latter. Then the commissioners' line would take about $\frac{1}{3} + \frac{1}{4} = \frac{7}{12}$ ths, that is, a little more than a half of the passengers travelling at any point on either line. This is confirmatory of what we said in our last, namely, that the commissioners' line would pay worse than a line made to either Cork or Limerick alone if made in the natural course of traffic and travelling.

One object of the commissioners' is to go far from the Grand Canal, that the railway may do it the least possible injury. Now experience has shown that railways by the side of canals are not injurious, but advantageous, because the mighty increase in passengers and light traffic exercises

a beneficial influence on the heavy, the peculiar food of canals. The railway, therefore, would be a benefit, not an injury to the canal, if it was almost close to it. But this canal has really on its whole banks only one town of any consequence, namely, Tullamore, which has a population of 6,300. Consequently if the traffic of the canal be chiefly between Dublin and Limerick, it matters not where the railroad between the same two points goes. If it would do the canal any mischief, it would do it as well at 50 miles off as it would at one; and hence the commissioners 'save nothing to the canal by going far away.

Since our last we have endeavoured to see the sections of the Great Leinster and Munster Company, for the remainder of their lines, but owing to their having being lent have not been able. We are, however, informed that on no portion of the lines between Dublin and Limerick; Dublin, Kilkenny, and Cahir; Dublin and Wexford; Kilkenny and Waterford; do the gradients exceed $10\frac{1}{4}$ feet per mile. But on the commissioners' last section there are several gradients of $26\frac{1}{2}$ feet per mile on the grand trunk. Before we reach Limerick, there is one of $29\frac{1}{2}$ feet per mile; and before we reach Cahir, one of $35\frac{1}{2}$ feet per mile. From Cahir to Cork there is but one practical route, which every party must take. In gradients, therefore, the commissioners' line is much worse than the company's.

In point of distances, the company's lines are also generally superior to the commissioners'. For instance, by the company's, the distance to Kilkenny, as we have stated in our last, is $73\frac{1}{2}$ miles, and the commissioners' $5\frac{1}{2}$ miles longer. To Limerick, the company's distance is 111 miles, and the commissioners' $14\frac{1}{2}$ longer. Between the lines to Waterford, Wexford, and all the populous and bustling towns of the south-east of Ireland, no comparison can be made, for the commissioners have no railway provision for any of them except Waterford, and that in a most circuitous way. Only to one place can we find any advantage of distance, namely, to Cahir, 111 miles on the company's plan, and in the commissioners', as far as we can make it out, 110, which mile is, in our opinion, a poor set-off against $26\frac{1}{2}$ and $35\frac{1}{2}$ feet per mile gradients instead of $10\frac{1}{4}$.

Thus the commissioners' system is, in every sense, inferior to that of the company; worse gradients, longer distances, and for a vast number of the most wealthy and important parts of the district it professes to serve, it provides no railway communication whatever. To sum up its

merits in a few words, it is a system based on great and dangerous errors, incapable of doing any good, but certain of producing incalculable evils. We believe and hope, before our next, to see the abominable job which is endeavoured to be made of it, either abandoned by Ministers or crushed by the virtue and good sense of our representatives.

As the present contention is entirely on this south-western line, we have confined our observations to it, and the general principle of Government interference. We have, however, heard from pretty good authority, that the merits of the Great Central and other lines are as superior to the commissioners' plan as are those of the Great Leinster and Munster Company. Respecting these and other lines which are contained in the map of the General Irish Railway Committee, we should be glad to have some more particulars than we at present possess. The General Committee, we submit, would do well to publish a good pithy account of all the Irish railways which are projected or have Bills.

Railway Commission (Ireland) Expenditure.

Return to an Order of the Honourable the House of Commons, dated 12th February, 1839, for—

“A Return, in detail, under separate heads, of the Expenditure by the Commission in Ireland, on the subject of railroads in that country, stating the name of every person employed, and in what capacity employed, who received more than 100*l.* as salary or pay for the services performed; stating also the period of such services;” on the motion of Joseph Hume, Esq.

A. 1.—RETURN, in detail, under separate Heads, showing the Amount of Expenditure.

HEADS OF EXPENDITURE.	AMOUNT.		
	£.	s.	d.
Commissioner - - - - -	500	0	0
Secretary - - - - -	800	0	0
Clerks - - - - -	878	14	9½
Engineers - - - - -	2,437	8	6
Surveys and maps of proposed lines of railways, including trial lines - - - - -	5,950	18	11
Ditto of lines through North Wales - - -	367	10	0
Persons employed collecting statistical information	796	12	5
Expenses incurred in compiling and preparing maps - - - - -	704	6	11
Office expenses - - - - -	475	11	1
Travelling expenses - - - - -	281	17	9

112 RAILWAY COMMISSION (IRELAND) EXPENDITURE.

Contingencies	{ Postage - - £14 8 10 }	428 5 5½
	{ Books, maps, &c. 306 4 5 }	
	{ Miscellaneous 107 12 2½ }	
Total expenditure of the commission		- £13,621 5 10

Dublin, 1st March, 1839.

HARRY D. JONES, *Secretary.*

PARLIAMENTARY EXPENSES.

A. 2.—RETURN of the expenses incurred for engraving and printing 2,000 copies of each map, plan, and section, for distribution to the Members of both Houses of Parliament.

HEADS OF EXPENDITURE.	AMOUNT.
	£. s. d.
Engraving and printing—	
2,000 copies of map of Ireland - - - }	2,172 3 9
2,000 ditto " population - - - }	
2,000 ditto " traffic - - - }	
2,000 ditto " conveyance - - - }	
2,000 ditto " geological - - - }	
2,000 ditto " United Kingdom - - }	516 0 0
2,000 ditto " Ireland, 4 inches to a mile - - - }	
2,000 copies of plans of the northern lines, in 13 sheets - - - }	1,328 0 0
2,000 copies of sections of the northern lines, in 34 sheets - - - }	
2,000 copies of plans of the southern lines, in 17 sheets - - - }	7,149 16 3
2,000 copies of sections of the southern lines, in 50 sheets - - - }	
2,000 copies of plans of Welsh line - - - }	
2,000 copies of section, in 8 sheets - - - }	
Total - - -	- £11,166 0 0

Dublin, 1st March, 1839.

HARRY D. JONES, *Secretary.*

NOMINAL RETURN.

B.—NOMINAL RETURN of every person employed, and in what capacity employed, who received more than 100*l.* as salary or pay.

	£.	s.	d.
Peter Barlow, commissioner, from 26th October, 1836, to 13th July, 1838 - - - -	500	0	0
Harry D. Jones, secretary, from 26th October, 1836, to 28th February, 1839 - - - -	800	0	0
Charles Vignoles, engineer, from 6th December, 1836, to 13th July, 1838 - - - -	6,398	14	0*

John Macneill, engineer, from 19th December, 1836, to 13th July, 1838 - - - -	2,176	6	5*
Peter Barlow, jun., engineer, from 25th October, 1837, to 28th January, 1838 - - - -	158	0	0
Lieut. Harness (200 <i>l.</i>), William Stanley (156 <i>l.</i>), collecting and arranging statistical information, from 26th December, 1836, to 31st July, 1837, and from 17th January, 1837, to August, 1837	356	0	0
Edward Hornsby, clerk, from 14th November, 1836, to 30th November, 1838 - - - -	218	9	3
Henry Mason, clerk, from 1st December, 1836, to 31st August, 1838 - - - -	296	5	10½
<i>Dublin, 1st March, 1839.</i>	HARRY D. JONES, <i>Secretary.</i>		

[It appears that the total expense of this Commission has been 24,787*l.* 5*s.* 10*d.*]

London and Birmingham Railway, Situation, Financial Prospects, and Facts respecting it. By A FRIEND TO RAILWAYS AND TRUTH.

TO THE EDITOR OF THE RAILWAY MAGAZINE.

SIR,—I have to apologize to yourself, the Birmingham Company, and your readers, for an error in my letter to you on the above railway, respecting the estimated amount of their traffic. By some accident I copied from their report 581,107*l.* as the annual amount of traffic, instead of 1,285,965*l.* How the mistranscript occurred I confess I have no conception of, except that it was done in a great hurry, and at night, and that I mistook the line, the one sum being four lines above the other. The error is too glaring for any one I should hope to imagine it could be done intentionally, or with a view to wilful deception; especially as it is from a printed document in the possession of thousands, which could be referred to immediately. However, Sir, I admit I ought to have been more careful [we think so] in an article for the public eye, and therefore beg to repeat in the most ample form my apology to the company, yourself, and your readers.

Having gone so far in acknowledging and apologizing for my error, I should have remained quiet had it not been for a snarling critic in the "Railway Times," who would fain attribute the accident to impure motives, and would visit the sins of your correspondent on yourself; as if you were respon-

* These items include charges for assistant surveyors, chain-men, labourers, draughtsmen, maps and plans of the lines surveyed under the direction of Mr. Vignoles and Mr. Macneill.

sible for their negligence or blunders. "Preserve me," says a good old adage, "from my friends, and I can protect myself from my enemies." So might every company say with a vengeance which has the misfortune to be advocated by the polluting and blighting praises of the journal in question.* Look, Sir, for instance, at the London Grand Junction; look at the Eastern Counties, brought to the brink of ruin by the directive power and the pestilential hug of that journal. Freed now, however, from it and from the "peculiar talent" of one of its "respectable gentlemen," this company only wants the support of the "Railway Magazine," seconded by the abuse of the "Railway Times," to raise it in public estimation, and carry it out to a successful issue. If truth and honour rule its councils, I believe, Sir, I may say for you it is secure of the former, and I am quite sure it cannot then fail of the latter, of which indeed the first samples have already appeared.

This very reputable critic accuses me of asserting that the expenses of the Birmingham Railway are "nearly 75 per cent. of the receipts," while the "half-yearly account" shows them to be "not more than 41½." The "nearly 75 per cent," Sir, I have heard from gentlemen to whom some of the company's directors had told it. I submit this is a little better authority than the assertions of a journal rarely known to state the truth, except by accident. Now, as to the profit, in

* It is a fact well worthy of remark, that this blundering journal has never taken up a cause which has not failed, nor has the "Railway Magazine" latterly taken up one which has not triumphed. For instance, there was the Mails' Bill on railways, in which that traitorous paper turned against the companies, but which Bill was thrown, and the identical clauses objected to by the "Railway Magazine," expunged. Again, there is the Great Western Railway, which the "Railway Times" vilified, belied, and abused every week for twelve or fourteen months, and which the "Railway Magazine" steadily defended. What was the result but a triumphant majority, and a reconciliation of the gentlemen who had been led on by falsehood and slander to injure their property, and who, as soon as they had spurned the ignorant calumniators, were turned round on, and abused by the "respectable gentlemen" editors? Moreover, there are Lord Petre and the forgery cases. Lastly, comes the Eastern Counties. Every art of falsehood and invention had been pursued to cover the bungling mismanagement of this concern. The "Railway Magazine" pursued a steady opposition, amidst the most vindictive efforts to destroy it, and the late changes that have been made by a very large majority of the shareholders, is the highest compliment that could have been paid to the conduct of the Magazine, while it is as deep a reflection on that of the "Railway Times." I hope these examples will not be lost on the London and Birmingham Company. If they need the support of such a journal as the "Railway Times," public distrust will follow public confidence, and their high premiums and immense property dwindle into insignificance.

place of hypothetical assumptions, let us take a peep, with the published documents of the company, at the actual profits for the last six months. In this account I shall disregard the shillings and pence, and include only the items of expense which fairly belong to the half-year.

By the "revenue account" for "six months," pp. 39 and 40, "Railway Magazine," Nov. 37, the sums paid for "Locomotive and carrying accounts," general charges, mileage, and reservation for stock is 72,605*l.*—7,176 + 11,312 = 76,741*l.* To this must obviously be added the six months interest of the loans, and maintenance of way for the whole distance, 112½ miles. In the company's accounts both these sums are calculated only from the 17th September to December 31st, not quite 3½ months, and are not included for the remaining more than 2½ months, that is, they are taken for only 7-12ths of the time. The maintenance of way too is only taken for 31½, or say 32 miles, the remaining 81 being in the hands of the contractors. Now the interest for the 3½ months is given at 33,855*l.*, which multiplied by $\frac{12}{7}$ makes 58,037*l.* for the six months; and the maintenance of way is 7,176*l.*, which multiplied by $\frac{112}{32}$ and $\frac{12}{7}$ (that is by 6), gives 43,056*l.* for 112 miles for the 6 months. Again, the mileage duty, 8,816*l.* given, is doubtless only computed for the 76 miles opened for 2½ months, and the whole distance afterwards for 3½ months; about 1,400*l.* may therefore be added on this account.

The gross receipts for the 6 months are 219,973*l.* From this they have deducted 16,558*l.* for the expenses of coaching for the 35 miles during 2½ months unopened, which 16,558*l.* we shall, however, make them a present of, because we have taken the maintenance of way for the whole distance and time. There is also added an interest of cash balances for 3½ months, amounting to 962*l.*, a curious item. However, we will take it as the rest of the six months, and it will be $962*l.* \times \frac{12}{7} = 1,649*l.*$ The account will stand thus:—

For the Six Months.

PAYMENTS.	£.	RECEIPTS.	£.
Sundries . . .	76,741	Gross Ditto . .	219,973
Maintenance of way	43,056	Interest on balance	1,649
Interest of loans . .	58,037		
Extra mileage . . .	1,400		
Profit in six months	42,388		
	<u>£221,622</u>		<u>£221,622</u>

The profit to be divided for the 6 months should, therefore, be only 42,388*l.*, or, retaining a small reservation, say in round numbers, 40,000*l.* This on 2½ millions would be 1½ per cent. for the half-year. If the half-year's interest, 75,000*l.*, on the 3 millions, to make up the 5½ millions, had been deducted, there would be only about 25,000*l.* profit to be divided, or 1 per cent. on the 2½ millions, instead of 3½, the company's dividend.

Now, Sir, I challenge the secretary of the company, and any one of the directors; and, lastly, I challenge, Mr. Editor, you yourself, one of the most acute men in England in railway accounts, to disprove the above statement if you can. I have been charged with error. I admit I made a mis-copy. But what is the consequence of correcting it? My error gave a dividend of 4½ per cent. per annum for the profits on 5½ millions, whilst the actual fact gives only $\frac{2 \times 2\frac{1}{2} + 5 \times 3}{5\frac{1}{2}} = 3\frac{1}{2}$; that is, the rectification of my error reduces the dividend on an annual income proportional to the last half-year's receipts from 4½ to 3½ per cent. per annum!! Well, Sir, might you say, "the situation and prospects of this company are awfully serious, and we dread to look into them."

I may perhaps be told that when the whole machinery comes into proper play, the trade will increase, and will probably equal the estimated revenue, 1,285,965*l.* I confess I have strong fears that unless the prices are lowered, and the whole system of management, tyrannical bye-laws, and insolent servants changed, the income, which is now only about one-third of the above sum, will be diminished, not increased; and these fears, I am sorry to say, past experience confirms. For example, when the line was only partially opened, they carried 149,616 persons in less than 2½ months, but when it was fully opened, and all the evils of management came into operation, the number carried was only 151,941 in more than 3½ months, that is only 108,529 for 2½ months, or 27½ per cent. less!! Some diminution might be attributed to the season (though the fall is not a bad time for travelling), but this ought to have been much more than balanced by the attraction which the increased facilities and greater comfort to the passengers would have given had the system been a good one. The fact is, Sir, unless there be a radical reformation, Parliament in its duty to, and protection of, the public, must take the matter in hand, or this great line, instead of being a benefit to the country and public, will be a curse to

both and a sink of destruction for the capital employed. Sir, it is a fact notorious to every one, that no railway in England has done the mischief to the railway cause that the London and Birmingham has. Nor, Sir, with all due respect, do I think you are wholly free from blame in permitting things to go on so long as you have without noticing them. I do not mean to attribute improper motives to your silence—neither Swifts nor Swallows I well know can purchase spaces in your pages, whatever they can in others—but had you brought before the public the extravagant expenditure and mismanagement of this company in the way you so well know how to do it, it would have roused the shareholders, and have had its effect with the public.

I stated in my letter that good judges think the Birmingham line will cost 6 millions, and if I had said $6\frac{1}{2}$ or 7 it is not more than many believe it will. However, Sir, we are now told $5\frac{1}{2}$ are to complete it. I sincerely hope it will; but what security have we for it? I do not wish to throw discredit on gentlemen's statements, yet, I confess I place but little reliance on the company's estimates; and with your permission I will give my reasons in a few facts why I do not.

The original estimates for land and works was 2,205,352*l.*, with 294,648*l.* contingencies, making 2,500,000*l.* "The *sufficiency* of this estimate," says a prospectus (see R. M., No. 13, p. 199), "has been ascertained by the Committee of the House of Commons, upon the testimony of Mr. Stephenson, and supported by two other eminent engineers." At the eighth half-yearly meeting this proved *sufficient estimate* was found *insufficient* by two millions; and at the eleventh meeting by 3 millions!!! making the actual cost $2\frac{1}{2}$ times the estimate, and the error about 3,300,000*l.* on only 2,200,000*l.* estimate!!!!

Ten or eleven tunnels were computed to cost 250,286*l.*; one only of the ten, the Kilsby, is said most materially to have exceeded the whole sum. The land required was estimated at 250,000*l.*; it has exceeded 637,869*l.* The offices, stations, pumps, &c., were calculated at 19,600*l.*, which sum was afterwards raised to 70,000*l.*; they have actually cost 700,000*l.* (R. M., vol. 5, p. 259). Mr. Stephenson proved, with the two "eminent engineers," on oath, that he could finish the works for 1,874,752*l.*, he has spent 3,830,212*l.*; and 500,000*l.* more is wanting.

In the articles of locomotives, &c., the business of the engineer, one might have expected more accuracy. Let us see

if it is so. The original estimate for locomotives to carry on a trade of 738,692*l.* per annum was 40,000*l.*; but for a trade of under 440,000*l.* per annum the company have laid out 67,093*l.* The wagons, coaches, &c., were to cost 21,000*l.*; by the last report there has already been paid for them 127,249*l.*

In every case the engineer has dealt in minima, but to prevent, I suppose, a lopsiding of the concern, the secretaries have dealt as largely in maxima. One of them, likewise supported by two other eminent traffic-takers (makers?), first computed the amount of traffic which the line was sure to have at 738,692*l.* per annum. As the necessity for more capital grew up so also did this paper revenue, until it reached 1,285,965*l.* Unfortunately, however, experience has only granted them a real traffic—and that a sickly one—of less than 440,000*l.* for the year; that is a little more than one-third of the secretary's revised estimate.

Thus the engineer's estimates have generally been about one-third, and the secretary's revenue about three times the truth, which has the effect of raising the capital to eight or nine times what it ought to be.

Now, Sir, can you draw from these facts—similar to which I have a large store by me—what grounds there are for believing that 5½, 6, or even 7 millions will be all that will be wanted? Or can you tell me what prospect the company have of raising a declining income, now only about 1,200*l.* per day, to above 3,530*l.*, the secretary's paper estimate? I have the honour to be, Sir,

Your very humble servant,
A FRIEND TO RAILWAYS AND TRUTH.

List of Railroads in the United States, to December, 1838.

WE have been favoured with the following lists of railways and canals in the United States, up to the end of 1838, by a friend who has just received it from a gentleman of authority in America, and we understand it is the most complete list extant.—ED. R. M. The figures denote the length in miles, and those marked with a * are in operation with locomotives.

MAINE.—*Bangor to Orono, 10 miles. Portland to Dover, N.H. Ditto to Portsmouth. Ditto to Augusta, 192 miles. Belfast to Quebec, 227 miles.

NEW HAMPSHIRE.—*Nashua and Lowell, 15 miles. Ditto to Concord.

VERMONT.—Central road from Lake Champlain to Boston. Brattleborough to Bennington. Rutland to Connecticut River. Norwich and Hartford.

MASSACHUSETTS.—*Boston to Lowell, 26 miles. *Ditto to Worcester, 44 miles. *Ditto to Quincy, 4 miles. *Andover to Haverhill, 15 miles. *Boston to Providence, 41 miles. *Dedham branch of ditto, 3 miles. *Taunton ditto, 11 miles. *Andover and Wilmington, 8 miles. Taunton to Somerset. *Worcester to Norwich, 58 miles. Ditto to Springfield (Conn. River), 116 miles. Springfield to Hartford. *Boston to Salem, 15 miles. Salem to Newburyport. New Bedford to Fall River, 13 miles. Pittsfield to West Stockbridge.

RHODE ISLAND.—*Providence to Stonington, 47 miles. Ditto to Fall River, 13 miles.

CONNECTICUT.—*Hartford to New Haven, 35 miles. Manchester Company. Hartford and Springfield, ditto. Fairfield county, ditto. Worcester and Hartford, ditto. Housatonic, ditto.

NEW YORK.—*Buffalo to Black Rock, 3 miles. *Ithaca to Oswego, 29 miles. *Albany to Schenectady, 16 miles. *Troy to Ballston, 25 miles. *Rochester to Carthage, 3 miles. *Saratoga to Schenectady, 22 miles. *Utica to Schenectady, 77 miles. *Brooklyn to Jamaica, 12 miles. *Buffalo to Niagara, 23 miles. *New York to Harlem, 7 miles. *Lockport to Niagara, 24 miles. *Auburn to Syracuse, 26 miles. *Catskill to Canajoharie, 68 miles. *Hudson to Mass. line, 30 miles. Jamaica to Greenport, 86 miles. New York to Lake Erie, 505 miles. Saratoga to Whitehall, 41 miles. Rochester to Attica, 45 miles. Albion to Batavia. Auburn to the Erie canal. Aurora to Buffalo. Bath to Crooked Lake. Buffalo to Erie (Penn.) Rome to Ogdensburg. Bingham to Penn. line. Castleton to West Stockbridge. Dansville to Rochester. Poukeepsie to Conn. line. Elmira to Penn. line. Fish House to Amsterdam. Geneva to Canandagua. Keeseville to Port Kent. Newburg to the Delaware River. Ithaca to Geneva. Ditto to Port Renwick. Lake Champlain to Ogdensburg. Manheim to Salisbury. Portland to Mayville. Medina to Darien. New York to Albany. Cooperstown to Coliersville. Rochester to Genesee Port. Saratoga to Fort Edward. Ditto to Schuylerville. Schoharie Co. to the Susquehanna. Troy to Bennington. Utica to the Susquehanna. Glenn's Falls to Warrensburg. Warsaw to Le Roy. Rome to Watertown. Whitehall to Rutland. Attica to Buffalo. Auburn to Ithaca. Batavia to Lockport. Brooklyn to Coney Island. Courtlandville to Oswego. Herkimer to Trenton Falls. Lansingburg to Troy. Oswego to Utica. Schenectaday to Troy. Across Staten Island. Syracuse to Brewerton. Utica to Syracuse.

NEW JERSEY.—*Camden to Amboy, 61 miles. *Jersey city to New Brunswick, 31 miles. *New Brunswick to Trenton. *Trenton to Philadelphia, 26 miles. *Patterson to Jersey city, 16 miles.

Elizabeth Town to Somerville, 25 miles. Belvidere to ditto, 35 miles. *Burlington to Mount Holly, 7 miles. *Morristown to Newark, 20 miles. Delaware and Atlantic. Bridgeton and Centerville. Belvidere and Port Colden. Medford. Belleville. Bergen County. Monmouth and Middlesex. Camden and Woodbury. Camden to Mount Holly. Woodston to Bridgeton. Camden to Egg Harbour.

PENNSYLVANIA.—*Philadelphia to Columbia, 81 miles. *Hollydaysburg to Johnstown, 36 miles. *Mauch Church to coal mines, 9 miles. *Ditto to the mines on Room Run, 5 miles. *Mount Carbon, 7 miles. *Mine Hill and Schuylkill Haven, 20 miles. *Port Carbon to Tuscarora, 36 miles. *Schuylkill Valley, 13 miles. *Port Carbon to Mill Creek, 7 miles. *Pine Grove to coal mines, 4 miles. *Port Clinton to Tamaqua, 23 miles. *Lackawaxen, 16 miles. *Westchester to Columbia Railroad, 9 miles. *Philadelphia and Norristown, 19 miles. *Pottsville, Sunbury and Danville, 51 miles. Philadelphia and Reading, 40 miles. Oxford to Port Deposit, 38 miles. *Philadelphia to Baltimore, 93 miles. Chemung canal to Blossbury, 40 miles. *Carbondale, 16 miles. *Beaver Meadow, 26 miles. Reading to Port Clinton, 20 miles. *Philadelphia and Wilmington, 17 miles. Catavissa and Tamaqua, 38 miles. Williamsport and Elmira, 73 miles. Lancaster and Harrisburg, 36 miles. Harrisburg and Chambersburg, 50 miles. Downingtown and Norristown, 20 miles. Marietta and Columbia, 3 miles. Strasburg, 5 miles.

DELAWARE.—*Newcastle to Frenchtown, 16 miles. *Wilmington and Susquehanna, 33 miles.

MARYLAND.—Baltimore to Ohio River, 360 miles (*84 miles finished.) *Harper's Ferry to Winchester, 30 miles. [A railroad is soon to be made along the great valley of Virginia to the southwest, till it shall meet the New Orleans and Nashville road, which will make a railroad communication between Baltimore and New Orleans, of 1,200 miles.] Baltimore to Philadelphia, (see Pennsylvania.) *Baltimore to Washington, 40 miles. *Baltimore to York, (Pennsylvania), 60 miles.

VIRGINIA.—*Richmond to Coal Pitts, 12 miles. *Richmond to Manchester, 13 miles. *Petersburg to Blakely, 59 miles. *Norfolk to Weedon (N. C.) 77 miles. *Richmond to the Potomac, 58 miles. *Hicksford to Gaston (N. C.) 18 miles. Staunton to Potomac. Falmouth to Alexandria. Staunton to Scottsville. *Louisa Railroad to the junction of the Richmond Railroad, 50 miles. Navigable waters on the Rivananna, to a point in Rockingham County. Petersburg to City Point on James River. Richmond to James River. Fredericksburg to Charlottesville. Suffolk to Portsmouth. Taylorsville to Louisa Court-house. Lynchbury to Tennessee line. Danville to ditto. Cherrystone to Maryland line. *Petersburg to Bellfield, Halifax and Wilmington (N. C.), 220 miles. *Richmond to Petersburg, 23 miles. Ditto to York-

town. Smithfield to the Winchester and Potomac Railroad. Kenawha Selines to Coat River. Portsmouth and Roanoke. New Shenandod. James River and Roanoke.

NORTH CAROLINA.—*Bellfield to Raleigh, 80 miles. Wilmington and Raleigh, 170 miles (17 miles done already). Cape Fear and Yadkin River. Yadkin to Wilkesborough. Newbern to Clinton (Central Railroad.) Raleigh to Fayetteville and thence to Charleston. *Petersburg and Roanoke, and the Portsmouth and Roanoke railroad, from Petersburg and Portsmouth in Virginia, to the Roanoke in North Carolina, 29 miles. *Greensville to Roanoke, 18 miles. Beaufort to Fayetteville.

SOUTH CAROLINA.—*Charleston to Hamburg, on the Savannah River, opposite to Augusta in Georgia, 136 miles. Charleston to Cincinnati (commenced), 607 miles.

GEORGIA.—Augusta to Athens, 114 miles. Ditto to Warrenton, 40 miles. *Altamaha to Brunswick, 12 miles. Athens to Knoxville (Tenn.) Macon to Forsyth, 25 miles. Forsyth to Westpoint, 85 miles. Savannah to Macon, 200 miles (30 miles in operation). Augusta to Columbus, 210 miles. Macon to Columbus. Columbus to Westpoint, (Troupe Co.). Western and Atlantic Railroad from Tennessee State line, to the river Chattahoochee (1000 men now at work on this road). *Georgia Railroad begins at Augusta, and is to go to Athens (114 miles), Madison and Greensborough (70 miles are done and locomotives upon it), 70 miles. [It is intended to extend this road to the Western and Atlantic Railroad, making a communication from the river Tennessee to Charleston.] Ockmulgee River to Flint River, at the head of steam-boat navigation. Brunswick to the Chattahoochee River.

ALABAMA.—*Decatur on the Tennessee to Tuscumbia, avoiding the Muscle Shoals, 46 miles. Daleton to Greensborough, 50 miles. Erie (Black-warrior) to ditto, 17 miles. Mobile to some point on the Tennessee River. Montgomery on the Alabama to Westpoint (Geo.) on the Chattahoochee (15 miles done), 76 miles. Demopolis and Woodville. Livingston to Moscow. Benton to Haysville, 18 miles. Montgomery to Pensacola, 156 miles.

MISSISSIPPI.—Woodville to St. Francisville, 38 miles. Vicksburg to Clinton (16 miles with locomotives), 54 miles. Grand Gulf to Port Gibson, 7 miles. Natchez to Canton, through Gallatin and Jackson (in progress), 150 miles. Natchez to New Orleans. Jackson to Brandon, 14 miles. Brandon to Mobile. Princeton to Deer Creek, 20 miles. Columbus to Aberdeen. Manchester to Benton, 14 miles. Natchez and Woodville (branch of Natchez and Canton), 41 miles. Monticello (branch of ditto).

LOUISIANA.—*New Orleans to Lake Ponchartrain, 5 miles. *Ditto to Carrollton, 12 miles. Ditto to Nashville, 560 miles. [This railroad is to be continued through Tennessee and Virginia

to Balto. and form a part of the great railroad-line from Maine to New Orleans.] New Orleans to Lake Borgne, 20 miles. Atchafalaya to connect Point Coupee with Opelousas, 30 miles, and to extend to the Sabine, 150 miles. Alexandria (Red River) to Cheyenneville, 30 miles. Port Hudson (Miss. River) to Jackson, Clinton, &c., 28 miles. Baton Rouge to Clinton, 20 miles. New Orleans to Bayou Sarah, 101 miles. Ditto to English Turn, 5 miles. Springfield to Liberty, 30 miles. Livingston Railroad. Providence on the Mississippi to the Great Raft, Red River, 100 miles. Iberville Railroad, from Plaquemine on the Mississippi to head-waters of the Bayou.

TENNESSEE.—Nashville to New Orleans (see Louisiana).

KENTUCKY.—* Lexington to Frankfort, 29 miles. * Frankfort to Louisville, 66 miles. * Portage railroad to Barren River, 2 miles. Hopkinsville to Cumberland River, 56 miles. Henderson to Nashville. Green River. Russellville to Clarksville. Louisville, Knoxville, and Nashville. Madisonville and Pond River. Middletown, Paris, Covington, and Latona Springs. Falmouth and Lexington.

OHIO.—Dayton (Mud River) to Sandusky on Lake Erie, 153 miles. Massillon on the Ohio Canal to Pittsburg, 108 miles. * Sandusky to Munroeville, 16 miles. Norwalk to Huron, 12 miles. Akron to Perrysburg. Ashtabula to Liverpool. Bridport to Lower Sandusky. Chillicothe to Cincinnati. Circleville to ditto. Cleveland to ditto. Cleveland to Pittsburg. Cleveland to Warren. Columbus to Little Sandusky. Columbus to Springfield. Columbus to Mad River and Lake Erie Railroad. Coneant and Erie Railroad to the Penn. line, toward Beaver. Cleveland to Franklin in Portage County. Cayahoga Falls branch to Cleveland and Warren and Perrysburg railroads. Fort Wayne to Piqua. Springfield to Cincinnati. Mansfield to New Haven. Melmore to Republic. Zanesville to Ohio River in Belmont County. Newark to Mount Vernon. New Haven to Munroeville. Ohio, Maumee and Wabash, from Akron to Fort Defiance. Ohio State line in Ashtabula County to the Miami River and thence to the Wabash and Erie Canal. Stillwater to the mouth of the Maumee River. Toledo to Sandusky City. Urbana to Columbus. Vermillion to Birmingham. Wellsville to Fairport. Bellefontaine to Perrysburg. Mouth Black River to Ashland. Ditto to Elyria. Carrollton to Lodi. Lima to Anglaise and thence to Shanesville. Massillon to Ohio River. Maumee in Lucas County, to Sandusky, and Toledo Railroad. Ohio River in Columbiana County to the Indiana line. Venice to Bellevue. Vermillion to Ashland. Wellsville to Steubenville.

INDIANA.—Madison on the Ohio, through the central part of the State passing by Indianapolis, to Lafayette on the Wabash and Erie Canal, 140 miles (20 miles finished). New Albany and Crawfordsville, 158. Michigan and Erie railroad from the south-end of Lake Michigan to the Wabash and Erie Canal at or near Fort

Wayne. Many other railroads in this State connected with Illinois.

ILLINOIS.—Alton on Mississippi to Springfield, 70 miles. Ottaiva, the termination of Illinois and Michigan Canal by Vandalia to the mouth of the Ohio. Danville to Springfield, 100 miles. Quincy to ditto, 90 miles. Alton to Galena (Lead-mines), 350 miles. Galena to Ottaiva. Grafton to Springfield. Meridosia to Jacksonville. Chicago to Vincennes. Alton, Wabash and Erie. Belleville and Mississippi. Central Branch Wabash. Galena and Chicago. Mississippi, Springfield and Carrollton. Mount Carmel and Alton. Perkin, Bloomington, and Wabash. Rushville. Shawneetown and Alton. Wabash and Mississippi. Warsaw, Peoria and Wabash. Waverly and Grand Prairie. Winchester, Lynnville, and Jacksonville. Cairo, confluence of Ohio and Mississippi to some point at or near the southern termination of the Illinois and Michigan Canal, *via* Vandalia, Shelbyville, Decatur, and Bloomington, and from thence *via* Savannah to Galena. Ferry at St. Louis, to the Coal Mines, at Bluffs, 6 miles. Jacksonville to Augusta, 22 miles. Chicago to des Plaines, 12 miles. Naples to Jacksonville, 22 miles. Lower Alton and Hillsborough to the central railroad intersecting the Terre Haute. Belleville to Lebanon. Bloomington (McLean county) to Mackinawtown in Tazewell with two branches—to the Illinois River and through Tremont to Pekin.

MISSOURI.—Marion City to Palmyra. St. Louis to the Iron Mountain, 85 miles. Palmyra to New York in Shelby and thence to Missouri River at Chariton. St. Louis to Lafayette, 100 miles. St. Louis to the Lead Mines in Washington and Franklin Counties. Louisiana on Mississippi to Columbia, and thence to Rochefort, Missouri River.

MICHIGAN.—Detroit to the St. Joseph's River, 190 miles (*60 miles in operation). Munroe to New Buffalo on Lake Michigan, 200 miles (35 miles in operation). * Toledo to Tecumseh, 50 miles. Tecumseh on the River Rairin to Ipsilanti on the Huron. * Erie and Kalamazoo, 20 miles. Detroit to Pontiac, to be continued to Saganaw, on Grand River. Detroit to the Maumee. Black River and Grand River. Detroit to Shiawassee. Gibraltar to Clinton.

ARKANSAS.—None.

FLORIDA.—* St. Joseph's to Lake Wymieo, 6 miles. * Tallahassee to St. Mark's, 20 miles. Columbus to Pensacola (doubtful). Jacksonville to Tallahassee (ditto). Pensacola Bay to Mobile Bay, 40 miles. St. Augustine to Picolata, 18 miles. Pensacola to Montgomery (see Alabama).

WISCONSIN TERRITORY.—Lafontaine on Fox River to Winebago Lake. Belmont to Dubuque, 30 miles. Dodgeville to ditto by Mineral Point.

IOWA TERRITORY.—None.

Extracts from a Manuscript Work, entitled "Theoretical and Practical Essay on Bitumen, setting forth its uses, in remote ages and revival in modern times, and demonstrating its applicability to various purposes."*

[Continued from page 25.]

It was long doubted whether it could be made available for carriage-road pavement in great commercial thoroughfares. However, the experiments made in London, Paris, and other Continental cities, have set this question at rest, although it required much ingenuity and repeated experiments to arrive at the process by means of which the object was to be attained. The objection to the ordinary carriage pavement, as in the case of foot pavements, is, that the rain penetrates between the stones, and impairs the substratum, thereby overbalancing in a short time the equality of pressure necessary to preserve the integrity of the surface. This evil may be avoided, in a great degree, by cementing with bitumen the common paving stones in a heated state ; but a preferable kind of road may be made with artificial paving-stones composed of granite chippings, encased or imbedded in bitumen, and cast in moulds. These stones are laid in the same manner as common paving-stones, with the exception that they are generally placed diagonally, and they are cemented together with mineral tar mastic. The pavement thus formed is, without any exception, the most durable of any yet discovered. It possesses the singular advantages of being almost entirely free from dirt, of deadening sound, allowing a firm footing, and facilitating draught in consequence of the diminution of friction. Such a road, instead of breaking up from the effect of rain, which undermines the ordinary pavement, is rendered more solid by heavy pressure, and, if well laid in the first instance, requires no repair for an indefinite period.

The use of bitumen has become progressively more extended on the Continent, and new modes of application discovered and adopted. In damp situations, its effect has been to render many houses and buildings healthy and comfortable, which before were scarcely habitable. In the roofings of cellars, vaults, and the arches of railways, it has

* This is one of the best practical treatises we have ever seen on this important subject, and we shall hail with pleasure its appearance before the public, not more on account of its intrinsic merit than the useful information it contains.—Ed.

proved peculiarly useful, not in France only, but throughout all the neighbouring parts of the Continent. Its use as a pavement has become, within the last five years, so universal under the encouragement it receives from the French Government, that it is unnecessary to particularize the places where it has been employed, or the results attending its application. There is scarcely a town of importance in France, or on the Continent, where the bitumen of Seyssel and Bastenne will not be found extensively laid down. The success of those two companies has hitherto been equal, each of them employing the mineral tar of the Bastenne and Gaujac mines in the bitumen manufactured by them. The Seyssel Company have also used a limestone rock, partially impregnated with mineral tar, found at Seyssel, near Pyrmont; but in this respect they have not been imitated by the Bastenne Company, who were led by experiment to the conclusion that the asphaltic rock did not combine so well with the mineral tar necessarily admixed with it to form bitumen, as calcareous matter properly prepared for the purpose. The quantity of mineral tar essential to the perfect amalgamation of the materials composing bitumen, has been ascertained to an extreme degree of nicety. The addition of three or four per cent. too much of tar, counteracts the tenacity and durability of the bitumen, while an insufficient admixture of it is equally prejudicial. In employing asphalt, however, it is impossible to tell with any degree of accuracy, how much or how little mineral tar should be used. In some parts of the rock there is from five to ten per cent. of tar, while in others, there is from ten to fifteen. In some places, the rock having been exposed to atmospherical influences for centuries, the properties of the substance have become considerably affected. The difficulty or rather impossibility of ascertaining what quantity of mineral tar should be added to the asphalt, is proved by this circumstance—that, on analyzing some of the Seyssel bitumen at Paris, it was discovered to contain thirty-five per cent. of tar, or nearly one-half more than ought to be used. On the other hand, the mineral tar, when heated, was found to combine much more intimately with well dried and pulverized calcareous matter, than with asphaltic rock; and the quantities of the ingredients to be employed being carefully adjusted, the mastic was found by the Bastenne Company preferable in every respect to that of Seyssel, while its price was materially decreased by the comparative facility of obtaining the material.

The foregoing exposition must have convinced our readers of the inestimable value of bitumen, either in its pure state, or in combination with other substances. Its hardness and durability, in which it exceeds stone and granite, its adhesiveness, elasticity, and imperviousness to moisture, cannot but ultimately secure its universal adoption, in spite of prejudice and interested opposition. The purposes to which it has already been found applicable, may be summed up in the subjoined enumeration. Its importation into this country will be considered as an era in the history of our improvements in art. Its advantages are inappreciable in a country like ours, where our noblest monuments are subject to speedy deterioration and decay, from the variableness of the climate, and the general humidity of the atmosphere. We may now ensure perpetuity to such specimens of architecture as merit preservation. Our improvements in chemistry will no doubt enable us also to discover such combinations of bitumen as will greatly extend the sphere of its usefulness. It will in general be found to add most materially to our comforts, whether in private or in public buildings, as it renders them warmer and more salubrious.

OBJECTS TO WHICH BITUMEN IS APPLICABLE.—1. The structure and repair of public and private roads, promenades, footpaths, terraces, &c. 2. Railways. 3. Fortifications. 4. Bridges. 5. Canals. 6. Churches, and all buildings of public resort. 7. Colleges, and all similar establishments. 8. Piers, wharfs, the flooring of dry and other docks. 9. Prisons and convict-cells. 10. Markets and bazaars. 11. Slaughterhouses. 12. Bonding warehouses and granaries, where the exclusion of rats and other vermin is most desirable. 13. Tombstones, monuments, and vaults in cemeteries. 14. The flooring of public buildings, halls, &c., where the absolute exclusion of moisture is required. 15. Baths, aqueducts, reservoirs, tanks, pipes, sewers, drains, &c. 16. The facing of all masonry and timber work. 17. Sea and river walls. 18. Roofs, cellars, vaults, underground kitchens, &c. 19. Fastening balustrades, balconies, &c. &c. 20. Paving the bottoms of ships, to preserve them from worms and insects. 21. Waterproofing cloth, tarpaulings, and all textile substances. 22. Varnishes for pictures and other purposes. 23. Medical uses. 24. Coating iron-work of almost every description, which will prevent its oxidation from air and water.

French Pneumatic Railway by M. CLEGG.

M. CLEGG, has presented to the French Academy of Sciences, a description of a Pneumatic railway, very like that of Mr. Pinkus in this country, on which a commission of MM. Arago, Savary, Poncelet, Coriolis, and Seguiet, have been appointed to examine it.

The description given by the commissioners is, that a long iron cylinder is to be laid on the ground between the rails on which the carriages run as usual. The cylinder contains a valve or piston, which when the air is partially withdrawn on one side, is forced along the tube by the excess of pressure on the other. At the top of the tube is an aperture of a certain size the whole length of the cylinder through which an arm fastened to the piston passes. This arm has a communication with the first carriage, and the whole aperture is kept air-tight except about where the arm is.

M. Clegg describes the surface of the tube on each side of the aperture for an inch and a half as plane. The surfaces are covered with a band of leather entire from end to end of the tube. One side of this band is fastened to the iron tube with pins, so as to be air-tight in the usual way. The other side of the band falls in a groove or gutter, about the depth of the leathern band, filled with soft grease or tallow, which also renders this side of the leather when down air-tight. As the arm drawing the carriage passes along, the band is raised and the grease is softened by a warmer (*chauffoir*) attached to the carriage. After the arm has passed, the band is repressed down and rendered air-tight and smooth, by a finger exercising a slight pressure and friction.

The leather band has above and beneath it metallic plates about 6 inches long at a small distance from each other, the under plate being nearly the breadth of the aperture of the cylinder, and of course falling within it; while the upper extends from within $\frac{1}{2}$ inch of the fastened edge of the band out to the other edge. By this means the band is rendered flexible to the motion of the arm. The whole is protected from the influence of the weather by a leather covering, which the arm raises as the carriage goes onwards.

M. Clegg enumerates the following advantages from this invention, which our readers will see is in principle precisely Pinkus's, with the bare difference, as far as we can see, of the band being fastened down on one side.

1. Economy in the construction of the road. 2. A suppression of the excessive expense of repairs in the locomotives. 3. No danger of explosions. 4. Impossibility to run off the rails. 5. An avoidance of all disagreeable shocks from the machines, &c.

The commissioners observe, that at first sight it might appear extraordinary that the increased expense of the large cylinder would afford any saving; but M. Clegg hopes to suppress all viaducts, tunnels, and the increased quantity of land arising from our cuttings and embankments, as well as to do with lighter rails.

He proposes to divide his cylinders in lengths of about 2,000 metres, $1\frac{1}{4}$ mile or more; and to make the rarefaction by the aid of steam-engines of 15-horse power, and air recipients of a great volume. The road cylinders are to be about a foot diameter.

A further account is promised when the commissioners bring up their report. They say that a model of it is now exhibiting in Paris.

Plan for Increasing the Strength of Iron Steam-boats.

By TYRUNCULUS.

TO THE EDITOR OF THE RAILWAY MAGAZINE.

SIR,—The great extension of the use of iron steam-boats is one which will certainly call into activity many new processes, suggested by the experience of this novel branch of exercise. Among the desiderata is, most certainly, the attainment of the greatest strength consistent with the lightness of the material, and it may be well worthy of consideration whether something may not be done to effect an improvement on the present system. The most eligible form for strengthening combinations of iron is certainly its application in ribbed plates; for the ribs in the plates, while they involve little increase in weight, from their mechanical constitution, insure a much greater degree of strength.

The use of iron in this form for roofs, arches, and other constructive purposes, is now very extensive, and has obtained the sanction of the highest authorities, while its adoption in this new branch may, perhaps, be worthy of some experiment. Some of the many parties who consult your widely-circulated Magazine may, if this idea be not already adopted, esteem it worthy of their attention, and thus furnish some excuse for an intrusion on pages devoted to higher objects. I am, Sir, TYRUNCULUS.

Observations on the Statistical Law of Births, in Opposition to Malthus and Quetelet. By H. CLARKE, Esq., &c.

TO THE EDITOR OF THE RAILWAY MAGAZINE.

SIR,—You have done so much for railway statistics, that perhaps you may indulge in making a few observations on a knotty point in another branch, the much-contested question as to the influence of births upon population.

The results have hitherto been deduced by a comparison of the whole births with the whole population; that is to say, with those above and below the age of increase; and the consequence is, that in a country favourable to longevity, as England or Belgium, for instance, where there are a greater number of persons above the age of increase, deductions are made from data to which they can bear no reference. It appears to me that, instead of considering the whole births relatively to the whole population, the whole births ought to be considered relatively to the whole productive population; as, for instance, between 15 and 40: thus Rome, where there is one death in 28 inhabitants, and England, where there is one death in 58, according to M. Moreau de Gennev, might, with regard to the proportion of births, appear more on an equality than they do now. This plan may lead us, perhaps, to truer results, for it appears a strange anomaly that while, according to Caspar, marriage is favourable to human life, that, according to Malthus and Quetelet, fecundity should be injurious to population.

I am, Sir, yours, &c., HYDE CLARKE.

Notices of Bills for the Session of 1840.

The following are the only lines for which, up to the time of our going to press, all the notices required by the Standing Orders have been given. Those marked with an * have no titles in the notices.

Birmingham and Derby Junction.—To alter, amend, and enlarge some of the powers of the Act; to divert part of the main line, to alter levels, and also to effect junctions with the London and Birmingham, Grand Junction, and Birmingham and Gloucester Railways.

Birmingham and Gloucester Railway.—To alter, amend, explain, and repeal some of the powers of two Acts, and to make an extension to the Gloucester and Berkeley Canal.

Chester and Crewe Railway.—To alter, amend, and enlarge some of the powers of Acts, and to make an extension to Monks Coppenhall, terminating by a junction with the Manchester and Birmingham Railway; also a branch to the Grand Junction Railway, and an extension to the river Dee, and to make one or two wet docks.

** Chester and Plas Madoc.*—To commence at Chester by junctions with the Chester and Crewe and Chester and Birkenhead Railways, and to terminate at Plas Madoc, with a branch to Frwd, in the township of Gwersylt.

Croydon and Epsom Railway.—To alter, amend, and enlarge powers of three Acts; also to authorize the company to make a new line from Croydon to Epsom.

** Coventry and Leamington (Warwick) Priors Railway.*—To commence from the London and Birmingham Railway at Coventry, and to terminate at Bath-place, Leamington Priors, Warwick, with a Branch to near St. Nicholas Church, Warwick.

Doncaster, North Midland, and Goole Railway.—To commence by a junction with the North Midland, at Swinton, and to terminate at Horse-fair, Doncaster, also at Bennithorpe, Doncaster, and at the docks in Goole, to straighten part of the course of the river Dun, at Ward Wood.

Grand Junction Railway.—To alter, amend, and enlarge the powers of five several Acts; also to make a branch from Warrington to the Liverpool and Manchester Railway, at Huyton, another from Wednesfield to Wolverhampton.

Great North British Railway.—To commence at Edinburgh, and terminate near Claremont-place, Newcastle-upon-Tyne, with branches to the town and harbour of Dunbar, and to Catchburn, Northumberland.

Great Western Windsor Branch Railway.—To commence by a junction with the Great Western Railway, at Slough, and to terminate at Peascod-street, New Windsor.

Harwich Railway.—To commence by a junction with the Eastern Counties Railway, near Colchester, and to terminate at Harwich; also to incorporate the company.

Horsham Railway.—To commence by a junction with the Brighton Railway, at Horley, and to terminate near Horsham-gaol, with a branch to Hill's-place.

** Lambeth Railway.*—To commence by a junction with the Greenwich Railway, and terminate with the Westminster-bridge-road new line.

London and Dorking Railway.—To commence by a junction at Wimbledon with the Southampton Railway. New line.

London, Lewes, Saint Leonard's, and Hastings Railway.—To commence by a junction with the Brighton Railway, at the parish of Keymer, to terminate near the Fountain Inn, St. Leonard's.

London and Salisbury Junction Railway.—Commencing by a junction with the London and Southampton Railway, in the parish of Kingsworthy, Southampton; terminating in the parish of Milford, Salisbury.

Leeds and Bradford Railway.—Commencing at the Parks and Monk Pits, Leeds, terminating at Mill-street, Bradford, with branch at Wortley, to form a junction with the North Midland Railway.

Liverpool and Manchester Railway.—To alter, amend, explain, repeal, and enlarge powers of seven several Acts and to make a railway from that line at Salford, to the Manchester, Bolton, and Bury Railway, communicating with the Manchester and Leeds Railway, near Hunt's Bank.

Manchester and Birmingham Railway.—To alter, amend, enlarge, and repeal certain powers, &c., of Act, to deviate and extend line, to join the Manchester and Leeds, and Liverpool and Manchester Railways, and from thence through Salford to the Manchester and Bolton Railway, also branches to Macclesfield, Poynton, and Woodford.

* ***Manchester, Bolton, and Bury Branch Railway.***—Commencing at Kersley and terminating at Lower Booths.

* ***Morecambe Bay Railway.***—To commence by a junction with the Lancaster and Preston Railway at Lancaster, to cross the Duddon Sands and Morecambe Bay, terminating by a junction with the Maryport and Carlisle Railway, and a branch.

Northern and Eastern Railway.—To alter, amend, and enlarge the powers and provisions of Act, also to extend time for the purchase of lands and completion of works, to alter line and terminus near London.

Northern Union Railway.—Commencing at the line of the Durham or Cox Hoe branch of the Clarence Railway, at Ferryhill, continuing to the Durham Junction Railway at Houghton-le-Spring, to the Brandling Junction at Nether Heworth, terminating at Newcastle-upon-Tyne; with branches to the Great North of England Railway, and to Gillgate, Durham.

Portsmouth and London Railway.—Commencing at Portsea and terminating by a junction with the proposed Horsham Railway at Horsham, also to divert the course of the river Arun.

Stockton and Hartlepool Railway.—Commencing by a junction with the Clarence Railway at Bellingham, and terminating by a junction with either the Hartlepool Railway or Dock.

Penrith and Carlisle Railway.—To commence at Penrith and terminate by a junction with the Newcastle and Carlisle Railway, in the township of Botchergate, Carlisle.

Saint George's Harbour and Chester Railway.—To construct a harbour by a sea-wall or breakwater, from the Great Orme's Head in Llandudno-bay, Carnarvon; the railway to commence at the Great Orme's Head, terminating by a junction with the Chester and Crewe Railway at Rowton.

Shrewsbury and Birmingham Railway.—To commence at Abbey Foregate-street, Shrewsbury, and terminating at two points on the Grand Junction Railway, in the parish of Bushbury, and at Wednesfield, Stafford.

West Durham Railway.—To commence in the township of Crook and Billy-row, county Durham, and terminating at Byers-green, Auckland, Durham.

REPORTS.

LONDON AND SOUTHAMPTON RAILWAY.

Ninth Half-Yearly Meeting held 27th February, 1839, at Nine Elms, Vauxhall; JOHN EASTHOPE, Esq., M.P., in the chair.

REPORT.—Statement of the finances of the company, viz.:—

An Account of Receipts and Payments to December, 31, 1838.

RECEIPTS.		£.	s.	d.
On calls		1,280,791	0	0
Coach traffic		31,734	4	9
Loan		271,200	0	0
Interest		5,572	14	7
Total		£1,589,297	19	4
PAYMENTS.		£.	s.	d.
Expenditure in raising the capital, procuring the Act of Parliament, &c.		41,467	2	0
Land and compensation, including charge for surveying and valuing		263,555	11	7
Conveyancing and law charges		12,081	17	2
Cuttings and embankments, bridges, culverts, and stores for the same, stations, temporary buildings, fencing, draining, &c.		792,580	1	2
Iron rails and chairs, and sleepers		257,538	9	1
Wagons, implements, and tools and stores		55,976	15	7
Engines and carriages		79,177	17	4
Surveying and engineering		26,706	9	9
Salaries, wages, rent and taxes, printing, stationery, postage, travelling and other incidental expenses		18,909	2	10
Directors' expenses and fines, from the commencement of the undertaking		3,550	0	0
Debenture bond stamps and interest		4,750	17	5
COST OF MAINTAINING THE WAY AND WORKING THE LINE.				
Locomotive power—Coke, oil, cotton, waste, &c., engine driving, repairs of engines and tenders, men's wages, repairing, and salary of superintendents	£8,968	2	1	
Coach disbursement—Clerks' salaries, guards' and porters' wages, repairs of carriages, trucks and horse boxes, cleaning and oiling carriages, printing and stationery, and petty expenses	4,581	12	0	
Police	1,162	4	3	
Maintenance of way	3,779	16	6	
		18,491	14	10
		1,574,785	18	9
Cash in hand		8,512	0	7
Funded property in Three per Cent. Consols, invested as required by the 14th clause of the Act of Parliament		6,000	0	0
Total		£1,589,297	19	4

• MONTHLY RECEIPTS.—TRAFFIC.

1838.		£.	s.	d.
June	17	3,085	18	11½
July	15	3,765	0	8
August	12	4,218	17	7½
September	9	3,805	9	3
October	7	3,967	2	8½
November	4	5,072	2	2½
December	2	4,220	10	6½
"	24	4,334	17	11
		<u>£32,459 19 10</u>		

MEM.—It will be seen that this sum is greater than the item in the above account: it comprises a sum of 725*l.* 15*s.* 2*d.*, which was received in December, but not included in the account, not having been paid into the hands of the Company's banker until January.

It will be in the recollection of the proprietors, that when the directors met them in August last, it was intended to open the railway as far as the Winchfield and Hartley-row station, as soon as the completion of the works would allow. This was done on the 24th of September, and the effect, as far as the traffic of the line is concerned, has been to bring to it a majority of the coaches travelling to the south and south-west of England.

The number of passengers on this line of country is small in the winter months as compared with those of the summer; and therefore the opening of the line between Woking-common and Winchfield has done little more than sustain the same amount of revenue which had accrued during the summer months for the shorter length between London and Woking-common.

The actual traffic viewed in relation to the season of the year, and the competition of coaches which is not likely long to continue, has fully equalled Mr. Chaplin's estimate, published in August, 1837.

On the line between Winchfield and Basingstoke, and also between Winchester and Southampton, the cuttings and embankments are, with very trifling exceptions, completed, and a considerable part of the permanent road is laid. These portions of the line will, as before stated, be ready for opening in May next. This will render available about 20 miles more of the line, in addition to the 38 miles already opened, and leave unfinished only the 18 miles between Basingstoke and Winchester. These unfinished works between Basingstoke and Winchester, it will be recollected, were not commenced until after the passing of the Amendment Act, which greatly improved this portion of the line by authorizing a considerable deviation. This work is all comprised in one contract, with Mr. Brassey, and is proceeding most satisfactorily, although the section still presents a large quantity of unfinished earthwork; but the energy which is evinced, and which is in unison with the conduct of the same contractor in former instances, affords the directors entire confidence in the completion of Mr. Brassey's contract at the stipulated time, viz., the 1st of May, 1840, on which day the directors believe the whole distance to Southampton will be opened. Of the 3,200,000 cubic yards of cuttings and embankments required to be removed for the formation of the road in this district, 1,800,000 yards are already executed, leaving 1,400,000 yards to be

removed. The various unfinished works being all in progress under contract, the cost of completing them is no longer a matter of doubtful estimate, or liable to any other than very trifling contingencies. And although since the last estimate was laid before the proprietors in February, 1837, many changes have been made for the purpose of improving the line, and rails of 75 lbs. to the yard have been substituted for rails of 63 lbs., yet the directors are enabled to state, and it will doubtless be satisfactory to the proprietors to learn, that the whole cost of the land and railway will be less than the amount specified in that estimate.

On the other hand, the sum of 75,000*l.* estimated, or rather assumed, on that occasion as the cost of stations, engines, carriages, wagons, and machinery, has been found entirely insufficient to provide these accommodations on such a scale as is required by the probable traffic of the railway, and due attention to public convenience. The directors have deemed it prudent, and ultimately economical, to construct these establishments on the requisite scale at the outset, in preference to merely opening the line of railway as a road, and then having to incur fresh expenses, in altering and adding to inadequate establishments, besides failing, until that object should be accomplished, in either giving satisfaction to the public, or doing justice to the character and capability of the undertaking.

There has been no unnecessary expense in architectural designs or decorations. The objects aimed at have been utility and durability, at the smallest practicable cost; and although the expense will greatly exceed the estimated or assumed sum of 75,000*l.*, yet the directors have the satisfaction to inform you that they will be enabled to complete the whole without calling for any extension of capital, or contemplating any further application to Parliament. They have only to ask of the present meeting a resolution empowering them to borrow the remaining part of the sum of 460,000*l.*, authorized by the Acts of Parliament to be raised by way of loan, and whereof a sum of 321,200*l.* has already been borrowed on debentures, as will be seen in the statements of the company's accounts.

The railway was opened to Woking-common on the 21st of May, and was extended to the Hartley-row station on the 24th of September. The traffic has produced 42,158*l.* 2*s.* 9*d.*, and the expenses thereon amount to 24,788*l.* 9*s.* 7*d.*, being 58½ per cent. on the gross receipts. This sum of 17,369*l.* 13*s.* 2*d.* the directors do not recommend to be divided among the shareholders at present, but they fully expect, when they meet them in August next, to be enabled to propose a dividend which will be satisfactory.

The shares for the Portsmouth and Gosport branch having all been taken by the shareholders of the parent line, a bill has been presented to Parliament, and which has every prospect of receiving its sanction. By order of the court of directors,

WILLIAM REED, *Secretary.*

BRISTOL AND EXETER RAILWAY.

General Half-yearly Meeting held March 5th, 1839, in Bristol;
P. RICKETTS, Esq., in the Chair.

REPORT.—The directors have the satisfaction of stating that, although the season of the year, since the autumnal half-yearly meeting, has been necessarily unfavourable to the rapid progress of the works, they are nevertheless so far advanced, as to warrant a confident hope, that the great bulk

of what remains to be done, in the construction of the line between Bristol and Bridgwater, will be finished in the course of the present year, and several portions of the line so far completed, as to allow of the formation of the permanent way to be commenced before the end of this year, and the remainder proceeded with early in the spring of 1840.

The principal works are comprised in the two first contracts, chiefly as the western extremity of the Ashton-valley. In these, extensive progress has been made, and although more might undoubtedly have been done by the contractor, yet it is equally true, that the state of the works is such, that as the season advances a considerable force may be advantageously employed, and a very large quantity of work executed during the summer months.

For some distance beyond this point, the work is so light as to insure its early completion without difficulty.

At Puriton some interruption has been caused by impediments in the purchase of land; but these difficulties being removed, the facilities in the execution of the work are such, as to preclude any possibility of future delay.

It would not be easy to over-estimate the importance of bringing this division of the line into productive operation; particularly when considered with reference to the opening of the Great Western Railway from Bath to Bristol, and to the extended portion of the eastern end of that undertaking; which must by that time be in actual use; thereby affording such easy and rapid means of communication between London and the western counties, as must necessarily cause a very large portion of the whole traffic of the south-west of England, to pass over the entire distance from Bridgwater to Bristol. A source of profit, which must be farther greatly augmented by the probably contemporaneous opening of the railway which connects Gloucestershire with the great commercial and manufacturing districts of the north. But in addition to these decisive advantages, the directors cannot refrain from again adverting to the important and equally unquestionable fact, that there exists the easy means of bringing upon nearly two-thirds of the line to Bridgwater, a traffic exclusively belonging to this undertaking, by the formation of a packet station on the Bristol channel, and in immediate contact with the railway; presenting the safest and most expeditious point of communication, not only with the south of Ireland, South Wales, Cornwall, and the North of Devon, but even with America.

Every professional examination of the intended steam-packet station at Uphill, fully confirms the opinion previously entertained of the capabilities of that harbour, and of the cheap and easy practicability of suiting it to the reception of steam-vessels of all classes.

Under this conviction, founded on the reports of competent nautical surveyors, and encouraged by the result of a direct reference to high official authorities, the directors, under the powers of their late Act, have resolved to take immediate steps for securing to this company, the full benefit of a position, which would otherwise be unquestionably appropriated by individuals, whose views and interests might hereafter be far from identical with those of the proprietors of the Bristol and Exeter Railway.

Looking at the very close connexion between the Great Western and Bristol and Exeter lines, it cannot but be deemed a subject of congratulation, that the doubts which had been raised upon the great question of width of gauge have been dissipated.

The results of an extremely rigid inquiry, have fully justified the

confidence reposed by the directors in the system adopted, and have been ascertained at a period which precludes any inconvenient delay in the adoption of every preparatory measure for the construction of the permanent way, and for the timely provision of locomotive power, carriages, &c.

The numerous and urgent representations that have been received, in favour of an immediate prosecution of the works below Bridgwater, afford a gratifying proof of the increased and increasing extent to which the value of the undertaking is appreciated by the inhabitants of the western counties. With the sincerest desire however to accede to the wishes of the shareholders resident in that district, with an unabated conviction of the magnitude and certainty of the advantages to be derived from the extension sought for, and with a fixed determination to adopt as speedily as possible, every step that can conduce to the early continuation of the line to Exeter, the directors are, nevertheless, persuaded, that they will most satisfactorily discharge their duty, by faithfully adhering to the resolution expressed in former reports, to make expenditure and receipt go hand in hand, by an early opening to Bridgwater.

The construction of the bridge now in progress over the river Parrett, may be justly appealed to, as the best evidence of their anxiety to reach Taunton; a town of very great importance, less than ten miles beyond the bridge, approached through a fertile and populous district, by a route almost level, and itself the focus of such an extensive traffic in passengers and merchandise, as must at once place the question of revenue beyond the reach of doubt, and enable the company to complete the entire line to Exeter, without inconvenience to the shareholders.

Agreeably to clause 139 of the Act of Incorporation, four of the directors, namely, Messrs. James Gibbs, John Browne, John Tyrrell, and John Hare, retire by ballot from office; and the same number of qualified proprietors, are to be elected at the present meeting in their stead.

The three first have consented to be put in nomination, and are eligible for re-election.

The account of receipts and expenditure will show, that upwards of 62,000*l.* have been paid for land, and upwards of 113,000*l.* to the contractors for work actually executed.

The balance in the hands of the bankers on the 31st December, was 8,228*l.* 2*s.* 11½*d.* At present it is 8,938*l.* 7*s.* 8½*d.*

There is good reason to calculate upon the speedy payment of a very considerable part of the arrears on the fifth call.

It has been the constant endeavour of the directors, to make the calls as moderate as possible, and they are anxious to continue this system, as far as it can be made compatible with a due regard to the vigorous prosecution of the works, and an early return upon the capital invested.

But they deem it almost superfluous to remind any of the shareholders, that the practicability of such a system, must depend upon the punctual payment of the calls.

It will be seen on reference to the account, that the fifth call has been much better paid up, than was the case with the fourth, at the period of the last meeting: when upwards of two thousand more shares were in arrear on the fourth, than are now unpaid on the fifth.

On the third instalment, however, very little alteration has taken place; and it has been deemed advisable to give notice of forfeiture to several defaulters.

A list of the numbers of the shares will accordingly be submitted to this meeting, for confirmation of the forfeiture.

During the last year, between two and three thousand shares have passed, and others are almost daily passing, into respectable hands, in those parts of the kingdom, where such investments are perhaps best understood and appreciated: and this change is the more worthy of remark, as it has arisen during a period of extraordinary collision of opinions upon the leading features of railway construction; and may certainly be considered as unquestionable evidence of the intrinsic merit of the undertaking.

Account of Receipts and Expenditure, to the 31st Dec., 1838.

	<i>Receipts.</i>	<i>£.</i>	<i>s.</i>	<i>d.</i>
First Call (Deposit) of £2 10s. per share on	14,988 shares . . .	37,470	0	0
Reserved for land-owners	12			
	<hr/> 15,000			
Second Call of £2 10s. per share on	14,939 shares . . .	37,347	10	0
Reserved as above . . .	12			
In arrear . . .	49			
	<hr/> 15,000			
Third Call of £5 per share on	13,567 shares . . .	67,835	0	0
Reserved as above . . .	12			
In arrear . . .	1,421			
	<hr/> 15,000			
Fourth Call of £5 per share on	11,178 shares . . .	55,890	0	0
Reserved as above . . .	12			
In arrear . . .	3,810			
	<hr/> 15,000			
Fifth Call of £5 per share on	6,541 shares . . .	32,705	0	0
Reserved as above . . .	12			
In arrear . . .	8,447			
	<hr/> 15,000			
Interest received from bankers and shareholders		4,731	13	4
Registration and transfer fees		111	12	6
		<hr/> £236,090	15	10

Expenditure.

	<i>£.</i>	<i>s.</i>	<i>d.</i>
Parliamentary expenses, including parliamentary agents and fees to counsel, solicitors' bills, witnesses, canvassing, taking road traffic, hire of committee-rooms, and all law charges and disbursements, to the time when the Act of Parliament received the royal assent . .	18,592	1	10
Engineering, including survey of the whole line, plans and sections, maps, professional evidence in Parliament, and all other expenses and disbursements in this de-			

partment, up to and since the time when the Act was obtained	6,304	10	10
Travelling expenses before and since the passing of the Act, and country agency employed in relation to the line generally	2,648	13	1
Printing, advertising, stationery, book-binding, and various incidental expenses in Bristol and London, from the first projection of the undertaking	3,034	8	6
Ascertaining and setting out the line from the date of the Act to the present time	3,914	19	4
Purchase of land, compensation for damages, surveying, valuing, and law expenses in the surveyance of the land to the company.	57,185	1	4
Purchase of machinery, implements, utensils, tools, maps, plans, &c. for use on the line, and at the engineer's office, including cost of the alterations and repairs at the office in Coronation-road, furniture and disbursements	3,893	9	8
Payment to contractors for work executed on the line under the several contracts	102,992	9	2½
Salaries in the engineering and surveying department, and to draftsmen	14,860	7	0
Office expenses, direction, salaries, office furniture, rent, postage, and carriage of parcels	7,115	18	4
Law expenses in London and Bristol in procuring the new Act of Parliament	2,234	4	1
Law charges connected with the general direction of the company's affairs	2,586	9	8
Balance in the hands of the bankers and secretary	£8,228	2	11½
Amount deposited with the treasurer of the county of Somerset, pursuant to section 95 of the Act of Incorporation	£2,500	0	0
	—10,728	2	11½
	<u>£236,090</u>	<u>15</u>	<u>10</u>

Since the 31st Dec., the directors have received further, on account of calls, the sum of £17,706 5s. 3d., and they have made various additional payments to the contractors, and for the purchase of land, wages, and other disbursements, to the extent of £16,996 0s. 6d., by which means the balance stated to be then in the bankers' and secretary's hands is varied, and now stands at the sum of £11,438 7s. 8½d., viz:—

Balance as above	10,728	2	11½
Calls received since	17,706	5	3
	<u>£28,434</u>	<u>8</u>	<u>2½</u>
Paid contractors	£10,327	8	7
For land	5,168	11	11
Wages and other disbursements	1,500	0	0
	—16,996	0	6
	<u>£11,438</u>	<u>7</u>	<u>8½</u>

(Signed)

FREDERICK RICKETTS, *Chairman.*
J. B. BADHAM, *Secretary.*

EDINBURGH AND GLASGOW RAILWAY.

Second Half-yearly General Meeting held at Glasgow, Feb. 18, 1839;
John Leadbetter, Esq., chairman, in the chair.

REPORT.—Your directors have pleasure in again meeting their constituents, and reporting the progress that has been made since their last half-yearly meeting on the 14th August, 1838, in the business of the company committed to their charge.

Agreeably to the instruction contained in the minutes of the last meeting of shareholders, your directors took immediate steps to proceed vigorously with the execution of the railway.

Being desirous that the company should derive full advantage from the appointment of Messrs. Rastrick and Locke as consulting engineers, your directors invited these gentlemen to come to Scotland as early as possible, to examine the proposed line of railway, and to advise them on some of the leading features of the work. These gentlemen accordingly arrived in Glasgow in November last; and, accompanied by the chairman of the company, and by Mr. Miller, the engineer, they went over the line, and prepared themselves to give an opinion on any engineering point that might at that time, or afterwards, be submitted to them. Your directors also met them, after the examination of the line, in Glasgow and Edinburgh, and received from them a written report on the points which had been specially referred to them.

Your directors, at a very early period, turned their attention to the letting of the contracts for the more important works on the line.

The Almond Valley contract, which comprehends the heaviest work to be executed, and which had, at the date of the last general meeting, been just advertised, was shortly afterwards let to Messrs. John Gibb and Son, of Aberdeen; whose long standing and high character as contractors, afford the best security for its completion within the time prescribed by the company's engineer. Your directors are happy to say that the expense of this portion of the line, although it embraces the great stone viaduct over the Almond, of 48 arches of 50 feet span each, will, notwithstanding the recent rise in the price of masonry, little, if at all, exceed the proportional amount of the Parliamentary estimate. In consequence of the arrangements previously made with Mr. Hogg, of Newliston, your directors were able to give Messrs. Gibb and Son immediate access to the ground at the Almond; and these parties have ever since been pushing forward their works with their usual promptitude and vigour. Notwithstanding the unfavourable season of the year, the contractors have already removed a considerable quantity of earth, and sunk two shafts in the Winchburgh tunnel, and have founded one abutment and several piers of the viaduct on the Almond; they have also laid down a great deal of building material, so as to avail themselves of the earliest improvement of the weather in spring.

Your directors, after completing the contract for the Almond Valley, next turned their attention to the contracts for the tunnels, &c., in the neighbourhood of Falkirk and of Glasgow. These were advertised to be let in four different lots, and although your directors experienced difficulty, in two instances, in procuring contractors possessing sufficient capital and experience, they have now the satisfaction of reporting, that they are all let on favourable terms, and to parties of whose ability to complete them your directors entertain no doubt.

Other contracts of smaller extent, but embracing 13 miles of the line,

have been advertised, and for these your directors expect there will be a keen competition, as many most respectable contractors have already intimated their desire to offer for them. Before the season is much farther advanced, your directors anticipate that upwards of 26 miles of the line will be let, and in course of execution; and they will proceed, with as little delay as possible, to have the working plans prepared, and the contracts let for the rest of the line.

But while the progress which your directors have made since the last general meeting has, as the meeting will thus see, been considerable, it is right that the shareholders should be aware that several circumstances (one of which is peculiar to this undertaking) have interfered with, and in no small degree retarded, their proceedings.

The meeting will no doubt recollect that in the House of Commons a special clause was introduced into the Bill, for the purpose of obviating certain objections as to the deposits. By this clause, the compulsory powers of the company, as to taking land, were suspended until an actual advance of 80,000*l.* had been made by the shareholders, and that sum deposited for a time in the chartered bank. Your directors were thus obliged to postpone all their negotiations for land until after a second call of 10 per cent. on their capital had been made and answered, so as to meet not only their current expenditure, but to supply funds for this heavy deposit.

The forms prescribed in their Act did not admit of this being accomplished sooner than January last; so that, for five out of six months which have elapsed since the last meeting of the shareholders, the hands of your directors were in this respect entirely paralysed. At the time now specified, however, the calls having been promptly paid by the shareholders, the deposit was made and the proper certificate obtained. Although the compulsory powers of the Act have only now come into operation, your directors have been busily occupied with preparations in anticipation of that event.

Another cause of delay still exists in the new periods of notices to landowners (whereby, in one case, two months have been substituted for thirty days), which were last session for the first time introduced into railway Acts, and which render the proceedings for acquiring land more tedious than formerly. Your directors, therefore, have here an additional cause of delay, but this they hope to obviate by exertion on the part of themselves and of their official assistants.

Notwithstanding these obstructions, however, your directors confidently anticipate that this great undertaking will be completed in the course of the year 1841.

Your directors have peculiar pleasure in being able to state, that the more minute attention which they have necessarily given to the line, in all its parts, since the works were begun, tends to confirm the previous conviction on their minds, that the best possible route has been selected for the establishment of a railway communication between the east and west seas, and between Edinburgh and Glasgow. This has uniformly been regarded by the promoters of this line of railway as of special importance, not only as securing the proprietors against successful competition, but as enabling them to look forward to the ultimate extension of their line at either end, and to the formation of profitable branches to those districts of the country where the growing population and wealth will speedily render such improved communication desirable.

Mr. Miller, the company's engineer, has in several instances been able, by his careful selection of ground when setting out the line, materially to

diminish the actual extent of the earthwork. He has also re-arranged the gradients, so that while the ruling gradient of 1 in 880 is maintained, and the working of the line is not in any degree prejudiced, a considerable saving of expense will be effected.

Your directors have watched with considerable interest the public discussions respecting the gage of railways, but have felt still more anxious to see this great principle in the railway system determined by the test of experience. They felt it their duty to keep the question open as long as possible, without arresting the progress of their works; and they are gratified to find that a respectable and influential body of the shareholders in Lancashire, although at present favourable to the present English gage of 4 feet 8½ inches, on grounds which your directors fully appreciate, have acquiesced in the postponement of the question. The time will soon arrive when the gage of this railway must be settled, and your directors will approach the question with their minds perfectly unbiassed, and with a determination to weigh deliberately every circumstance which can guide them to a right decision. But should the experience of the next few months throw such additional light on this subject, as to suggest a departure from the prevailing English gage, they will feel it their duty, before acting on the opinion so formed, to submit the whole question to the consideration of a general meeting of the shareholders.

Your directors have had their attention called to the state of the traffic in passengers and goods between Glasgow and Edinburgh, and, from what they have learned, they feel that they are entitled to state confidently that, notwithstanding the rise on the coach fares, and expense of land carriage, it is daily increasing. The whole coaches have been well filled, even during the winter.

In reference to the subject of traffic, the shareholders in this undertaking cannot but feel a deep interest in the exertions now making in England, to extend northward the great trunk lines which intersect Lancashire and Yorkshire; and also in the exertions of a similar kind, though not so matured, for ultimately prolonging those trunk lines from Newcastle to Edinburgh, and from Carlisle to Glasgow. The Edinburgh and Glasgow Railway is in so fortunate a position, that the success of either, or both of these lines of communication, will essentially promote its traffic; and the directors have felt it their duty to contribute 50*l.* towards each of the surveys, with the view of accelerating their ultimate execution.

There is herewith laid before the meeting, the balance-sheet of the company, for the half-year ending 31st December last. The shareholders will be gratified to learn that the calls have been paid up with unusual promptitude, and that there is a large balance at present in bank; which, however, will be rapidly diminished, by the instalments to become due to the contractors for the works now in progress and those about to be commenced.

Your directors, thinking it might be acceptable to the shareholders to know the extent of the company's expenses in a contest of three sessions, and of unexampled pertinacity, have caused an account to be made up to the 4th July last, the period when the Act was obtained. They amount to 53,589*l.* 0*s.* 8*d.*; but deducting the engineering department, and making a fair allowance for other expenses, which would have been incurred even without opposition, the extra expenditure will be under 30,000*l.*; but when the importance and the magnitude and the character of the opposition are considered, the sacrifice, though great, is not disproportioned to the object attained.

In conclusion, your directors beg to state, that in conformity with the

instructions of the last general meeting of the company, they have ordered a service of plate, to be presented to their chairman, Mr. Leadbetter.

Balance Sheet of Income and Expenditure of the Edinburgh and Glasgow Railway Company, from 4th November, 1835, to 31st December, 1838.

	£.	s.	d.
To cash received on calls	142,517	0	0
Interest on ditto	1,927	2	11
Rent	20	0	0
	<u>£144,464</u>	<u>2</u>	<u>11</u>
By land	20,834	15	10
Houses in Queen-street	2,000	0	0
	<u>22,834</u>	<u>15</u>	<u>10</u>
Solicitor and Parliamentary agents	20,286	18	5
Charges account, including expenses at formation of company, expenses of deputation and witnesses	10,558	4	4
Surveying and engineering	9,141	3	9
Salaries of secretaries and clerks	3,872	18	10
Advertising, printing, and engraving	1,548	12	7
Postages, parcels, and stationery	295	2	11
Counting-house furniture	31	6	0
	<u>68,569</u>	<u>2</u>	<u>8</u>
Cash in banks this date	74,700	13	11
Interest on Exchequer bills	1,184	15	1
Cash on hand this date	9	11	3
	<u>£144,464</u>	<u>2</u>	<u>11</u>

Account of Expenses incurred from 4th November, 1835, up to the passing of the Edinburgh and Glasgow Railway Bill, on the 4th July, 1838, having been Three Sessions in Parliament.

	£.	s.	d.
Charges account, including expenses at formation of company, and expenses of deputations, witnesses to London, and other incidental charges	10,219	14	9
Account of solicitors and Parliamentary agents	27,801	16	1
Surveying and engineering	10,290	7	1
Salaries of secretaries and clerks	3,872	18	10
Advertising, printing, and engraving	1,188	5	9
Postages, parcels, and stationery	215	18	2
	<u>£53,589</u>	<u>0</u>	<u>8</u>

YORK AND NORTH MIDLAND RAILWAY COMPANY.

Fifth Half-yearly General Meeting, held at York, Monday, Jan. 14th, 1839 ;
the LORD MAYOR in the Chair.

REPORT.—Your directors have the satisfaction of stating that, notwithstanding some unexpected delay in the completion of the contracts, Nos. 1, 2, and 3, they feel themselves fully justified, from the present state of the works, in announcing to the proprietors their intention of opening the line

from York to the Leeds and Selby line, by which a railway communication will be effected with both towns, in May next.

Since the last half-yearly meeting the plans and sections of the line between the Leeds and Selby Railway and the North Midland at Methley have been prepared, and the directors have been enabled to let the two following very important contracts, viz. :—

The Fairburn contract, length 1 mile 52½ chains. This contract was let in December last to Messrs. Craven and Sons, and is to be completed in the spring of 1840. It includes the erection of a bridge of considerable magnitude across the river Aire, and also an embankment and cutting of great extent.

The Altofts contract, length 2 miles and 1 chain. This contract was let at the same time to Mr. John Stephenson, and is also to be completed in the spring of 1840.

The above two contracts comprise the heaviest works on the whole line, and it is highly satisfactory to your directors that they have been able to let them, at sums below the estimate of their engineer, to contractors of the highest reputation, who there can be no doubt, from their well known talent and experience, will carry on the works with all possible energy and skill, and complete their respective undertakings in the time stipulated by their contracts.

The remaining portions of this part of the line have not yet been let, your directors, however, hope to be in a situation to advertise for contracts for them in the course of a short time, and they feel the utmost confidence in being able to complete the whole of their line by the time the North Midland, the Leeds and Manchester, and the Great North of England Railways (of which it will form the connecting link), can be opened.

Your directors have purchased of the corporation of York for the sum of 5,000*l.*, about four acres of land within the city walls, being part of the moats and ramparts, which will enable them to form their depôt for coals and heavy goods immediately contiguous to the river. The purchase comprises also the old House of Correction, from which they are supplied with a quantity of valuable building materials.

Your directors, with a view chiefly to economy, had determined to form their station for passengers on the outside of the city walls. It appearing however to them, as well as to the directors of the Great North of England Railway, very desirable that the two companies should have a joint passengers' station, which was considered to be impracticable except within the walls, a negotiation was entered into between the parties and satisfactorily concluded; by which your directors consented to have their passengers' station in the garden now occupied by Messrs. T. and J. Backhouse (which had been already purchased by your directors), on being paid by the directors of the North of England Railway Company, a sum which your directors considered sufficient to compensate them for the cost of the ground required, and for the additional expense likely to be incurred by bringing their station within the walls. By this arrangement, your directors believe the convenience of the public will be greatly promoted, without any sacrifice on the part of the company.

Since the last half-yearly meeting, it has been found necessary on two occasions to have recourse to a jury for the purpose of assessing the value of property required for the railway, first of the garden before referred to in the occupation of Messrs. T. and J. Backhouse, and belonging to the trustees of Lady Hewley's charity; and afterwards of land at Fairburn, belonging to Lord Palmerston. In both instances the verdicts of the jury were such as to prove the expediency of this course of proceeding on the part of the directors.

Your directors have the satisfaction to state that before the recent advance in the price of iron, they contracted with Mr. Crawshaw, of the Cyxarthra iron-works for the supply of 2,000 tons of iron rails.

During the last week a deputation from the directors have been engaged in negotiating for the purchase of the land required for the purpose of that part of the line between the Leeds and Selby Railway and the North Midland, and your directors are happy to state that they have succeeded in concluding agreements with nearly all the proprietors, on what they consider very fair and reasonable terms.

It will be gratifying to the proprietors to learn that the call due in October last was very promptly and cheerfully paid.

Your directors also recommend to the meeting the propriety of granting a sum not exceeding 200*l.* towards the expense of making preliminary surveys of the country to the north of Newcastle, with a view to the formation of a line of railway on the eastern side of the island from Newcastle to Edinburgh. Mr. Stephenson has reported in favour of the practicability of the undertaking; and the North Midland and other companies, from a consideration of the great importance of such a line, and of the advantages which it offers to themselves, have already made liberal contributions towards effecting this object.

Your directors beg to suggest to the meeting, that after the payment of another call, it will be expedient to grant them the power of borrowing a sum of money under the powers of their Act.

In conclusion, the directors beg to refer the meeting to the following statement of the cash account up to the 31st December last:—

<i>Receipts.</i>		<i>£.</i>	<i>s.</i>	<i>d.</i>
Amount of receipts as per last statement	.	77,640	12	6
Cash on calls	.	45,410	5	0
Interest	.	316	9	8
Transfer fees	.	12	5	0
Old materials	.	37	15	0
Rent	.	36	10	0
		<hr/>		
		£123,453	17	2
<i>Payments.</i>		<i>£.</i>	<i>s.</i>	<i>d.</i>
Amount of payments as per last statement	.	59,721	0	0
General expenses	.	295	11	1
Law expenses	.	569	12	6
Mr. Stephenson on account of salary	.	696	0	0
Surveying and assistant engineers' salaries	.	284	3	6
Allowance to directors	.	250	0	0
Advertising	.	1	4	0
Commissioner of Copmanthorp enclosure	.	200	0	0
Land and compensation	.	2,152	13	6
Salaries	.	185	0	0
Iron rails, chairs, &c.	.	12,203	6	7
Wood sleepers, timber, &c.	.	2,306	0	10
Anti-dry Rot Company	.	293	0	11
Contracts	.	18,792	9	6
		<hr/>		
		97,950	2	5
Balance in the Bankers' hands	.	25,503	14	9
		<hr/>		
		£123,453	17	2

LONDON AND CROYDON RAILWAY.

Seventh Half-yearly Meeting, held in London, Friday, 8th March, 1839.

REPORT.—Having laid before the proprietors on two occasions, so recently as the 12th and 23d of January, minute details contained in the directors' and engineer's report of the progress and state of the works during the period which had elapsed since the half-yearly general meeting held in September last, it will be more useful in the present advanced state of all the works towards completion, to refer to such portions of the several contracts which yet remain to be done, as well as what has been already finished.

The buildings and works at the passenger stations, at Croydon, Norwood, and the Dartmouth Arms, are nearly finished, and are ready for the traffic. The retaining walls and ground for the station next Sydenham-bridge, the works of which are heavier, are also finished. At the more important station works at New-cross the passenger-house and shed and platform are nearly completed; the remaining works there, consisting of the engine-house, workshops, and the fixed engine-house, are in an advanced state.

The most important of all the works of this kind, namely, the brick-arching and other parts of the London station, have proceeded throughout the winter with but little interruption. Of the main portion, namely, that at the entrance, the arching and brickwork are nearly finished; further on, the arches which are to carry the railway over an angle of Canterbury-square are nearly completed, and the remainder of the work comprised between this point and Tooley-street and Glean-alley is proceeding steadily, the directors being anxious that the works of this very important part of the railway should be forwarded so as to fit the station for the reception of traffic contemporary with the completion of the line.

Of the remaining but unimportant parts of the brickwork, viz., the lighthouse at the junction near Corbet's-lane and the first bridge above the New-cross, the former is finished and the arches of the latter are turned; the centres will be struck in about a week.

With regard to the earthwork the whole of that part of the line from Croydon to the Dartmouth Arms, five miles and a half is completed, and the ballast nearly all laid. At the other end of the line, viz., from the junction with the Greenwich Railway, near Corbet's-lane, along the main embankment through the New-cross cutting and as far as the shallower part of the Forest-hill cutting, two miles and three-quarters; the earthwork is also finished; the length of the ballast remaining to be done along the whole line is about two miles.

For the last five weeks the laying of permanent way has been proceeding with renewed energy, and we are occupied in adding additional men as speedily as the better class of labourers required for this portion of the works can be procured. Out of the eight miles and three-quarters of double line, or seventeen and half single line, the double line is completed from Croydon to within three hundred yards of Annerley-bridge; the single line is carried out to Sydenham-bridge, and will be at the Dartmouth Arms in about ten days from this time; at the Corbet's-lane end the double line is laid from thence past the New-cross station, altogether one mile and twenty chains, except about two hundred yards of single line. About a quarter of a mile of double line is laid in the Forest-hill cutting. Out of the entire seventeen and half miles of single line about six and half miles remain to be done.

The earthwork not yet finished is comprised in the bottoms and slopes of the deeper part of the Forest-hill cutting; 502 men are employed in the earthwork of this contract, which will be finished in about five weeks from this time.

The inclined plane from the railway line to the level of the wharf at Cold-blow will be put in hand and the rails laid immediately.

The passenger carriages, viz., of the first and of the second class, are completed, and some of them are placed on the line.

Out of the whole number of locomotive engines, viz., seven, four are now on the railway, one more is just arrived at Camden Town, and the remainder will be delivered in the course of this and next month.

As it is usual in this advanced state of railway works when all the heavier parts are completed, and when the opening the line for traffic can be calculated upon, according to any fixed scale of progress maintained in the permanent way, we are anxiously endeavouring to forward all those works, contracts, and supplies, in order to complete them at the time the rail-laying is completed.

Notwithstanding the wetness of the season, commencing about the middle of November, and continuing with but little intermission to the end of February, the proprietors will observe, that the works along the line, and at the station, and all the contracts for supplies connected with the formation of the permanent way, and with the working of the line, have advanced with more energy than might have been expected. About the commencement of the year we were compelled, by the unfavourable state of the weather and other causes, to limit the amount of labour employed, to about 480 men; measures, however, were taken immediately after the special meeting of proprietors, about the middle of January, to put on an increased force upon all the works, and there are now 1,032 men, exclusive of smiths, &c. and those employed on the London station.

Estimating the further progress from the present date, at which the highest amount of labour is employed by the scale realized when the number of men have been gradually increasing from 487 to the present amount, we see no reason to question the calculation of the engineer that the opening of the railway may be expected in May next.

For any further information as to the state and progress of the works, we beg to refer the proprietors to the engineer's report, which will be laid before you on the present occasion.

With respect to the finances of the company, we beg to state that, in consequence of the resolutions passed at the special general meeting held on the 23d of January, 6,645 new shares were subscribed, the remainder, viz., 21, have been disposed of for the company's account.

Under the second resolution, passed at the last special general meeting, the sum of 3,700*l.* has been raised by the issue of bonds.

The available funds of the company may be stated as follows, viz. :—

	£.	s.	d.
Remaining instalments to be received in March and April upon the recent creation of 6,666 new shares . . .	40,774	10	0
Cash at the bankers' this day available	23,616	3	1
Bonds remaining to be issued under the vote authorized by the special general meeting of proprietors, held in January	26,300	0	0
Remaining sum proposed to be raised by the issue of bonds	24,000	0	0

Total £114,690 13 1

Amongst the resolutions to be submitted to the proprietors at the present meeting, we beg to recommend that a resolution be passed empowering the directors to raise the further sum of 24,000*l.* as above-mentioned, by the issue of bonds under the company's seal.

At the ballot which took place according to the provisions of the Act of Parliament, on the 4th instant, the following directors retired, viz., Jonathan Hayne, Esq. and Captain J. W. Pringle, R.E., both being re-eligible.

With due regard to the interests of the company, we have considered it expedient to take such preliminary steps as are required for obtaining an amended Act of Parliament during the present session, one of the principal objects being to vary the powers of the company as to the mode of raising money, provisions to the full effect sought not being included, according to the present practice of Parliament, among the powers hitherto granted to the company.

In all communications between your directors and the committee of inspection appointed by the proprietors in January last, our rule has been to afford all the information possessed by ourselves, both as to the matters specially delegated, and any others which may have appeared to the committee to be worthy of inquiry.

In furnishing the particulars, we have done all that was practicable consistently with the devotion of the greater part of the time to the pecuniary affairs of the company, consequent upon the late special meeting, and to the exertions which, in conjunction with the engineer, we have made to impress a highly accelerated movement upon the work going forward on the line and stations.

In taking leave of the proprietors on the present occasion, we congratulate them upon the approach of the time when the railway will be opened. In preparing ourselves for that part of the duties of management which consists in making the line of railway useful to the public and beneficial to the proprietors, we beg to be permitted to express our satisfaction also at the approach of the period, when the labours which we have constantly and anxiously devoted to the acquisition of the properties and the construction of the line of railway, will be rewarded by the completion of the works.

JOHN MOXON, *Chairman.*

Receipts.

	£.	s.	d.
Instalments on scrip of 1837 and 1838	63,802	10	0
Bonds	33,400	0	0
Exchequer bills sold	40,172	1	3
Loan	6,000	0	0
Rents	274	17	11
Interest	80	7	9
Works	516	15	8
Transfer fees	16	10	0
	<u>£144,263</u>	<u>2</u>	<u>7</u>

Disbursements.

	£.	s.	d.
Balance, 31st July, 1838	1,176	9	5
Works—			
B. and N. Sherwood	£3,470	9	10
Hoof, New-cross, Sellhurst, Sydenham, &c.	30,952	15	1
Forest-hill	17,096	11	4
Hunt, timber, fencing, kyanizing, &c.	12,180	16	1
Colson	674	0	0
Sundries	1,955	10	0
Grissell and Peto, London station	7,788	18	0
New-cross do.	6,577	19	0
Croydon do.	3,849	7	0
Do. & New-cross do.	2,231	13	0
	<u>86,777</u>	<u>19</u>	<u>4</u>

Engineering	1,834	19	0
Law	166	6	0
Land, freehold	15,375	10	6
Do., leasehold	1,254	13	6
Houses, freehold	3,821	11	8
Do. leasehold	7,471	2	6
Compensation	1,935	16	8
Rails	5,528	12	0
Engines	2,754	6	2
Carriages	3,115	0	0
Stamps, for bonds	198	0	0
Police	402	16	0
Salaries	318	18	0
Office charges	245	10	6
Advertisements	148	14	0
Petty expences	38	4	5
Printing and stationery	96	2	8
Rates and tithes	128	1	3
Interest	1,106	14	9
Rents	156	3	6
Insurance	3	12	0
Balance	10,207	18	6
	£144,263	2	7

London, Jan. 31, 1839.

R. S. YOUNG, *Secretary*.

**BIRMINGHAM, BRISTOL, AND THAMES JUNCTION RAILWAY
COMPANY.**

Special General Meeting held at the company's office, No. 1, Robert-street, Adelphi, Feb. 11, 1839; HENRY LUARD, Esq., in the chair.

REPORT.—The directors having received a requisition from certain of the Manchester shareholders, requiring a special general meeting of the proprietors to be called for the purpose of investigating the affairs of the company, determined that the general half-yearly meeting should be held as soon afterwards as was practicable, in order to afford the country proprietors who might come to that meeting an opportunity of attending. The present meeting has consequently been convened for the earliest day allowed by the Act.

The special general meeting was held on Monday last, and a Committee, consisting of four of the Manchester and four of the London proprietors, was appointed to investigate all such matters relating to the affairs of the company as they might think fit, with instructions to report to this meeting the result of their inquiries.

The following gentlemen are the members of that committee :—Manchester: Mr. Lord, Mr. John Walker, Mr. James Richardson, Mr. Taylor. London: Mr. Morgan, Mr. Wood, Mr. Le Breton, Mr. W. White.

The directors look forward with confidence to the report of the committee,* feeling satisfied that the investigation will tend to remove any

* This report appeared on the wrapper of our last number, and was highly satisfactory to the proprietors, and honourable to the directors and officers of the company.

erroneous impression which may have gone abroad regarding the administration of the company's affairs, and to establish the undertaking in public opinion as one of general utility, and which, by careful and zealous management, cannot fail to be profitable to the shareholders.

The directors have the satisfaction of stating, that although the weather during the present winter has been unfavourable, the works have proceeded satisfactorily. Contracts have been entered into for the construction of the whole of the line, with the exception of the lower portion of it between Eynham farm and the canal basin, and for the execution of that portion a tender has been received, and is now under the consideration of the directors.

The diversion of the sewers in the line of railway—a question that has engaged the deep and anxious attention of the directors, has at length, with much difficulty, been finally arranged, and the sewers are now in the course of being diverted in the manner most advantageous for the interests of this company, and towards the expense of which the Commissioners of Sewers and other parties have engaged to contribute a large sum.

The engineer has reported that, if the necessary funds are supplied, the railway may be completed, and opened for traffic during the ensuing autumn.

It has therefore become desirable that possession of the Kensington Canal should immediately be obtained, in order that some essential improvements may be made; and the solicitors of the two companies have been placed in communication with each other, for the purpose of removing the legal obstacles in the way of completing the purchase.

Negotiations are in progress with the promoters of a branch line of railway from the Great Western Railway to Windsor, for the use of the Thames Junction Railway; and as these negotiations promise a successful issue, a considerable revenue will be derivable from this source, should these parties obtain Parliamentary sanction to their proposed measure. That sanction they are likely to obtain, as the projected undertaking will be of great benefit to Windsor and the adjacent country, especially as it will enable coals to be sold there at a price which will effect to the consumer a saving of nearly 4s. per ton.

A ballot for three directors to go out of office has taken place, in accordance with the provisions of the Act of Incorporation, and it has fallen upon John Britton, Esq., William Gunston, Esq., and Robert Gunter, Esq., who are candidates for re-election.

A vacancy in the direction has also occurred by the retirement of Mr. Sturch, which the directors have declined to fill up, preferring to leave to the present meeting the nomination of a candidate to supply the vacancy.

The subjoined statements of the receipts and disbursements of the company, which have been prepared, as directed by the Act, to the 31st December last, shows that the receipts at that time amounted to 59,414*l.* 0*s.* 9*d.*, and the disbursements to 51,455*l.* 6*s.* 10*d.*, leaving a balance in the hands of the bankers of 7,958*l.* 10*s.* 11*d.*

Statement.

By instalments and interest to 30th June, 1838 .	£36,327	17	7	
Ditto ditto to 31st Dec. 1838 .	23,086	3	2	
	<hr/>	<hr/>	<hr/>	59,414 9

	To 30th June, 1838.			To 31st Dec. 1838.			Total.		
	£.	s.	d.	£.	s.	d.	£.	s.	d.
To legal and parliamentary expenses	5,768	15	4	14	5	0	5,783	0	4
Engineering and surveying	4,304	18	0	843	7	6	5,148	5	6
Provisional Committee	500	0	0	"	"	"	500	0	0
Direction	1,200	0	0	300	0	0	1,500	0	0
Salaries in secretary's department	1,112	10	6	207	10	0	1,320	0	6
Advertisements	812	3	8	72	17	0	885	0	8
Office expenses, rent, &c.	854	2	4	101	14	1	955	16	5
Office furniture	271	6	6	44	16	6	316	3	0
Kensington Canal Company . £2,380 15 10									
Deduct for alteration in the rate of interest on mortgage . 10 5 10	2,370	10	0	"	"	"	2,370	10	0
Printing and stationery	790	11	8	27	0	3	817	11	11
Land and compensation	6,285	17	11	7,188	5	8	13,474	3	7
Works	8,748	16	6	9,552	2	8	18,300	19	2
Travelling and miscellaneous expenses	"	"	"	83	15	9	83	15	9
	£33,019	12	5	£18,435	14	5	£51,455	6	10

To balance 7,958 13 11

£59,414 0 9

Dr.

General Account.

31st Dec. 1838.

To capital account, for sums received 59,414 0 9

£59,414 0 9

Cr.

31st Dec. 1838.

By capital account, for sums disbursed 51,445 6 10

Balance 7,958 13 11

£59,414 0 9

Balance 31st December, 1838.

	£.	s.	d.
To London and Westminster Bank	7,597	3	1
Manchester District Bank	1,917	1	11
Bristol Bank	121	9	11
Salisbury Bank	21	5	1
Sundry accounts due to the company	39	1	6

£9,696 1 6

By balance of capital account 7,958 13 11

Balances of sundry accounts due by the company 1,737 7 7

£9,696 1 6

GREAT LEINSTER AND MUNSTER RAILWAY.

[BEING unable to give the whole of the engineer's* very able report on this line, on account of its great length, we make the following extracts, which amply confirm in every point our own independent view of the superiority of this line over the commissioners.—Ed. R. M.]

Before entering upon the numerous and important points which have been thus laid before me for my consideration, I trust I shall be pardoned for making a general observation, suggested by the unprecedented position in which the Great Leinster and Munster Railway Company, and all parties interested in it, have been recently placed, and in which, at this moment, they actually stand.

It has never happened to me, in my professional life (and I believe I may venture to assert the same of the whole existing body of civil engineers) to have had a work of the magnitude of the Great Leinster and Munster Railway, projected, surveyed, designed, and carried through Parliament up to the very threshold of execution, so suddenly arrested, and submitted to a re-examination so searching, so extensive, and at the same time so minute, as that which the proposed Great Leinster and Munster Railway has received at the hands of Her Majesty's commissioners.

The commissioners possessed personally, collectively, and morally, the power, the knowledge, and the disposition (from the peculiar view they took of the subject) not only to detect any glaring error or omission, but also to unveil and expose every source of failure and weakness, existing, or likely to exist, in a project which had taken pre-occupancy of ground so necessary to the full development of their own plans.

During the time of this severe scrutiny, no persons connected with the undertaking in question (particularly parties so situated as your engineers) could be free from apprehension. The data upon which their opinions were formed had been obtained, and their conclusions from them had been drawn and acted upon, long before Her Majesty's commissioners were called into existence, or were armed with their immense power, or had thrown out the slightest hint of the principles which they have thought it their duty to adopt and recommend. It was natural that all parties who had assisted either in laying the foundation and rearing the superstructure, or were responsible for the principles upon which they were based, should have felt that this was a season of great anxiety.

But this period of apprehension, protracted as it was by unavoidable circumstances to great length, has passed; and your engineers have to congratulate themselves, the directors, and the proprietary, that so far at least as relates to the line from Dublin to Kilkenny, the recent evidence of Her Majesty's commissioners, contained in their report, fully corroborates the correctness of all that your engineers had so long before stated and advised relating to it. If we advert to the parties by whom this evidence has been given, to their intelligence, to their industry, and to the gigantic means and numerous agents they possessed for the collection of the materials upon which they founded their opinions, there can be no hesitation in admitting that it is of great importance and weight.

Still, favourable as this judgment of the commissioners is, as to the merits of the Great Leinster and Munster Railway, and conclusive as it is to my mind, it must not be forgotten that it has failed in convincing the commissioners themselves that the Great Leinster and Munster Railway, is one which they ought to recommend for adoption,—it has not even prevented them from stating to Her Majesty that the line from Dublin to Kilkenny is

* Mr. Macneill is the company's, and, also, one of the commissioners' engineers.

highly objectionable, either as a main trunk to the south and south-western parts of Ireland, or even as a distinct line from Dublin to Kilkenny!

It is with great deference to the commissioners that I state, as an engineer, that after a very careful examination of their report, I am unable to arrive at the same conclusion. I am therefore compelled to suppose that considerations of a far wider range than such as it is my duty to embrace, have produced their unexpected decisions with regard to the Great Leinster and Munster Railway line.

One of these decisions, and by far the most important, is prefaced and expressed by them in the following words:—

“This line [the Dublin-Kilkenny] has been laid out with great judgment, and its gradients are very favorable, but we strongly object to it as the main trunk to the south of Ireland. 1st. As a line to Cork it is four miles longer to Cahir (which is a common point,) than that by Maryborough. 2dly. The communication from the city of Limerick to Dublin by any connexion with it excepting by a branch line diverging at a short distance from Dublin, is quite out of the question.”*

In the first of these objections I think there is an error. The second does not necessarily involve a reason for objecting to the condemned line, and if this be true, where can be the strong grounds of objection, and the “important deficiencies” which the commissioners charge upon this line?

The fact is as regards the commissioners’ first objection, that according to a measurement made by your engineer, Mr. Aher, to test it, the directors’ line is but $1\frac{1}{2}$ mile longer than that of the commissioners; but taking it to be four miles, as the commissioners state it to be, even such a difference, in a length of 170 miles, and upon a railway whose gradients are much easier and summits less numerous, cannot, really, be a matter of very great importance.

The objection contained in the second item is soon forgotten by the commissioners themselves, for a little further,† the question of another communication, which does not diverge at a short distance from Dublin, is discussed by them, viz., a branch from the Kilkenny line to Limerick, proposed by the Great Leinster and Munster Company, to start from Ballysax, 16 miles farther from Dublin than Sallins, (the first point of divergence proposed,) accompanied by a slight notice of its beneficial effect.

In treating of this branch, I admit that it would exceed in its necessary combinations the commissioners’ corresponding route by 5 miles, but this is upon a line of not less than 152 miles in length, and whose gradients are rather more favourable. It has, however, the following valuable consequences, viz.,—

- 1st. The directors’ route from Dublin to Limerick will be $12\frac{1}{2}$ miles *shorter* than that of the commissioners.
- 2d. That the directors’ route from Dublin to Kilkenny will be 6 miles *shorter* than that of the commissioners.
- 3d. That the directors’ route from Dublin to Waterford will be 2 miles *shorter* than that of the commissioners.
- 4th. That railways carried into the south-east of Ireland may be reduced in length, and consequently in cost.

I. As to “*the superior advantages, if any, of the line proposed by the commissioners as a main trunk line.*”

There is, as is usual in competing lines, some features in each which give the line in which they are found a claim to preference. There are

* Comm. Rep., p. 39.

† Comm. Rep., p. 41.

also, as usual, some points in each of an opposite character. It is necessary to select and value such circumstances in order to decide with any accuracy upon the aggregate comparative merit of the lines. This is frequently a very difficult task to execute satisfactorily. In the present case it is more than usually so.

In a general view of the *advantages* of the commissioners' system as compared with that of the directors, the following present themselves as the more prominent, viz.,—

First Advantage.—That the commissioners' system will not require the construction of more than about five-sixths of the aggregate length of railway which will be necessary for the directors' system.

Second Advantage.—That when constructed, it will not require more than about the same comparative amount of maintenance.

Third Advantage.—That for a few miles out of Dublin it will not require so much embankment and excavation as may be required by the directors' system.

Fourth Advantage.—That the route-distance from Dublin to Cork (166 miles) is $1\frac{1}{2}$ mile shorter (the commissioners say 4) than by the directors' system.

Fifth Advantage.—That it provides railway-communication between *Thurles* and the following thirteen cities and towns,—Dublin, Limerick, Cork, Waterford, Rathangan, Mount Mellick, Maryborough, Mountrath, Portarlinton, Rathdowney, Cashel, Clonmel, and Carrick-on-Suir, which the directors' system does not. And

Sixth Advantage.—That it provides railway communication to the nine following towns, viz., Durrow, Abbeyleix, Ballynakill, Ballyragget, Rathangan, Portarlinton, Monastereven, Rathdowney, Templemore, Thurles, and Urlingford, which the directors' system does not. The population of these towns, not visited by the directors' system, amounts (exclusive of their neighbourhoods) to about 25,000. See Table V.,

(b) p.

The more prominent *disadvantages* of the commissioners' system, when similarly compared, are,—

First Disadvantage.—That the gradients, “on the regulation of which so much depends, both in respect to the original cost and the ultimate value of the railway to the country,”* are worse, and the summits to be crossed more numerous, than on the directors' system.

Second Disadvantage.—That increased distance as compared with the shortest line is necessary, and that in consequence the routes from Dublin to Limerick, and from Dublin to Waterford, are longer; and that all the routes from Kilkenny, viz., to Dublin, Limerick, Cork, Clonmel, Carrick-on-Suir, and Waterford, are “materially”† greater than on the directors' system.

Third Disadvantage.—That it requires passengers to expend *more money*, for their carriage from one principal town to another, on the above routes, than the directors' system does.

Fourth Disadvantage.—That, except in the case of Dublin and Cork, in which the two systems are nearly equal, it requires passengers to expend *more time*, in the transit from one principal town to another, than on the directors' system.

Fifth Disadvantage.—That it makes no provision for railway-communication between *Dublin* and twenty-six cities and towns, distributed over the counties of Carlow, Clare, Dublin, Kildare, Kilkenny, King's

* Comm. Rep., p. 37.

† See Comm. Rep., p. 41.

County, Limerick, Tipperary, and Wicklow, which the directors' system does.

Sixth Disadvantage.—That it makes no provision for railway-communication between any of the aforesaid twenty-six towns, which the directors' system does.

It is evident from the above, the commissioners' system does not establish a direct communication with the principal towns in so many instances as the directors' system.

Seventh Disadvantage.—That it makes no provision for a direct communication with the "rich and populous valley of the Barrow,"* nor for the districts of the south-east of Ireland, in which Ross, Enniscorthy, and Wexford, are situated, for all of which the directors' system does provide.

Eighth Disadvantage.—That it will require, in consequence of its steeper gradients, more numerous summits, and longer routes, a greater expense in providing locomotive power, and in maintaining the same, than the directors' system.

Ninth Disadvantage.—That it must necessarily pass through, and *seriously damage*, several ornamental demesnes near Dublin, which the directors' system does not in any case.

Tenth Disadvantage.—That the annual revenue it will produce, taking the existing number of passengers as the datum, will be less than that which may be derived from the directors' system. The revenue of each system, and their difference, are exhibited in Table V., p. 29.

It will be evident from all I have said, that my professional opinion must be, and is, that the second report of her Majesty's commissioners for the consideration of railways in Ireland, contains no facts of sufficient importance in *an engineering point of view*, to lead the directors of the Great Leinster and Munster Railway Company to prefer the system proposed by the commissioners, nor to induce the directors to form a less favourable opinion of the Dublin and Kilkenny line; always saving and excepting that most important and influential circumstance, that the commissioners themselves have thought it their duty to decide against the system so long put forth by the directors, and also to condemn the distinct line between Dublin and Kilkenny, though acknowledged and protected by an Act of Parliament, and possessing a proprietary anxious to complete it at their own cost and risk.

It is with great personal satisfaction, as one of your engineers, that I am able to add, that the data and plans upon which the Great Leinster and Munster Railway proprietary were induced to form themselves into a company, and to raise a sufficient capital for carrying the project into execution, have been in *no instance impeached by the commissioners*, and that, therefore, with regard to them there is nothing whatever in the report of the commissioners calculated at all to shake the confidence which the public has reposed upon those data, and the conclusions which have been drawn from them.

EASTERN COUNTIES RAILWAY.

Fifth General Meeting, held in London, 26th February, 1839; HENRY BOSANQUET, Esq., in the chair.

REPORT.—The directors stated, in their last report to the proprietary, the circumstances which had made it expedient to apply a much larger portion of the paid-up capital of the company, to the early acquisition of

* Comm. Rep., p. .

the land for the railway as far as Colchester, than to the construction of the railway itself, and which had caused a delay in the completion and opening of the first division between London and Ilford beyond the period originally anticipated. The payments made on account of land and compensation at the 4th July last, amounted to 163,776*l.* 13*s.* 9*d.*, and those on account of engineering and works, to only 86,128*l.* 4*s.* 3*d.*

The disproportion between these two heads of expenditure has not been so great during the last half year. The additional payments for land and compensation amount to 117,700*l.* 9*s.* 3*d.*; those for the construction of the railway to 101,532*l.* 18*s.* 2*d.*

From the Cambridge-road, where a temporary terminus was at one time proposed to be formed to Ilford, as also from Ilford to Romford, the railway is now far advanced towards completion, and a considerable portion of the permanent way is ready for the reception of the traffic. The directors, however, adhere to the opinion expressed in their last report, that the line ought to be brought forward as speedily as possible to the final terminus at Shoreditch; and as this may be done in about the same time as is required for the completion of the portions between Cambridge-road and Romford, they do not think it would be advisable to make any opening of the line till the whole distance of twelve miles from Shoreditch to Romford is finished. Contracts have been accordingly entered into for the execution within the next three months, of the whole of the viaduct from Cambridge-road to Shoreditch, with the exception of the last quarter of a mile, including the terminus, which is ready to be contracted for as soon as possession of the property is obtained.

In consequence of the Eastern Counties line penetrating so far into the heart of the metropolis, the terminus being less than a mile from the Bank of England, the cost of the land for the last two and a half miles, which is either covered with houses, or consists of valuable building-ground, has been necessarily very considerable, but not more so than the great and indeed unrivalled advantages thereby secured for this line amply justify. The total cost (including 22,500*l.* as the estimated amount of a few cases still under reference) will be about 206,000*l.*, of which 122,000*l.* remains to be paid. The property thus secured includes a frontage to Shoreditch of 300 feet, and ample space for passenger and goods stations.

The burden of this expense will not, however, fall by any means exclusively in the direct traffic of the Eastern Counties line. By a deed of arrangement which has been completed with the Northern and Eastern Company now engaged in making a railway to Cambridge, that company will avail itself of the Eastern Counties entrance into London, and of the Shoreditch Station, paying a fixed rental of 7,000*l.* per annum for twenty years certain, for the use of the latter, besides sufficient tolls for that portion of the Eastern Counties Railway between the junction of the two lines at Angel-lane and the London station (about three miles), which will be passed over by the passengers and goods of the Northern and Eastern Company. To this deed the company's common seal has been affixed by the directors, and they recommend that this act should be specially confirmed by the present meeting. Another company has been formed to connect the important port of Harwich, by means of a line of railway of about fifteen miles, with the Eastern Counties line at Colchester, and they are applicants to Parliament for an Act of Incorporation. With a view to encourage and assist this valuable ally, the directors have thought it advisable to consent to a liberal arrangement with respect to tolls in favour of this company, and they are prepared to meet in a similar manner any other parties disposed to assist in this way in completing all the railway

communications of the Eastern Counties by which the prosperity of the main line and the accommodation of the public will be obviously promoted in a very important degree.

An adequate establishment of engines, carriages, &c., for the conveyance of the passenger-traffic between London and Romford has been contracted for, and will now shortly be in readiness for delivery; but the entire completion and opening to the public of this part of the undertaking must depend in some degree on the requisite pecuniary supplies being duly furnished, and as the prompt payment of the present arrears on the late calls would enable the directors to secure to the concern the benefit of the next summer's travelling on this first division of the line, they must urge immediate payment on all proprietors still in arrear, and hope that they may not be driven to the adoption of measures to compel payment, which, in justice to the large body of proprietors who meet the calls with uniform punctuality, they cannot much longer withhold or suspend.

By the company's amended Act, it is provided that a sum of 533,333*l.* may be raised by way of mortgage on the security of the undertaking, or by the issue of new shares, or by both these means; and as it is desirable the company should take advantage of this power at the earliest possible period, the directors recommend that the proprietary should now give them authority to raise such additional sum, not exceeding 533,333*l.* as they may find necessary, and that either by way of mortgage or by the issue of new shares, or partly by mortgage and partly by shares, as they may judge best for the interests of the company.

The directors, on the 12th instant, declared forfeited all shares in arrear on the third or fourth calls, but on which the first and second calls have been paid, and in due course a special meeting of the proprietors will be called to confirm that declaration to such extent as may then be requisite.

Two vacancies having arisen in the direction through the death of Thomas Bilcliffe Fyler, Esq., and the retirement of the Rev. Dr. Chevallier, the board, in exercise of the powers given them in such cases, have elected in their stead Duncan Dunbar, of Limehouse, Esq., and Robert Crighton Wyllie, of Dover-street, Esq.

By the provisions of the Act of Parliament, six of the directors primarily elected (to be determined by ballot among themselves), are to go out of office at the present general meeting, and six proprietors holding not less than twenty shares each, are to be elected by the shareholders in their stead. The six gentlemen balloted out, but who are re-eligible, are, Sir Robert Alexander, Bart., John Cobbold, Esq., Louis Desanges, Esq., Charles Thomas Holcombe, Esq., Edward Leathes, Esq., Thomas Robertson, Esq.

The directors beg to refer to the balance-sheet, which is annexed, for a detailed statement of the company's receipts and expenditure since the period of the last general meeting.

The directors refer also to the report which follows, from Mr. Braithwaite, the engineer of the company, on the present state of the works. The skilful and workmanlike manner in which the whole have been executed, looking more especially to the prospects of stability and economical maintenance which they present, is, in the judgment of the directors, highly creditable to the engineer. That portion of the railway which is completed will bear an advantageous comparison, it is believed, with the best constructions of the kind in any part of the kingdom. By order of the board of directors,

HENRY BOSANQUET, *Chairman.*

26th February, 1839.

Report of the Engineer to the Directors of the Eastern Counties Railway.

GENTLEMEN,—In compliance with your instructions, I beg leave to submit the following report as to the state of the works, and the line, commencing at London, and terminating at Springfield, a distance of thirty-one miles. The whole of the London viaduct, commencing at Farthing-street, within 300 feet of the terminus, has been let to four respectable contractors. That portion between Devonshire-street and Dog-row, for a length of 31 chains, the whole of the foundations are laid, and the abutments and piers are nearly all carried, springing high, and several of the arches are turned. The ironwork for the three bridges, Dog-row, Ann-street, and Globe-lane, is in a very forward state. Nearly the whole of the portion from Dog-row to Winchester-street, a distance of 28 chains, is fenced off; several of the foundations are excavated, concrete forming, and the brickwork for the piers and abutments commenced; large quantities of materials are on the ground. A further distance of 11 chains, extending to Bethnal-green workhouse, is in possession of the contractor, and the houses are being pulled down. From Devonshire-street, eastward, to Angel-lane, at Stratford, the whole of the embankment is formed, with the exception of a small portion adjoining the viaduct; also small portions at Tregedar-square, in the Fair-field, at Old Ford, and east of the river Lea bridge, in all amounting to less than 30,000 cubic yards, which is being supplied from three different places, rendering the completion within a fortnight an easy task. The embankment from the river Lea bridge to Angel-lane is ballasted, and the permanent way laid. Westward of Lea bridge a considerable portion is ballasted, and the laying of the permanent rails is commenced. By means of a temporary stage or tipping frame, this embankment, containing upwards of 270,000 cubic yards, has been formed in less than nine months, notwithstanding the winter season, and the more than ordinary difficulties presented by the yielding nature of the marsh lands over which it crosses, and which has occasioned a serious subsidence for a distance of nearly half a mile, and which would have rendered the formation of this embankment an extremely difficult, tardy, and expensive operation, without the introduction of this useful, and, I am happy to add, successful expedient, which has not only enabled us to deposit the large quantity of 231,000 cubic yards out of the above quantity over one tip in so short a space of time, but has been the means of completing the work much under the estimate. It may be here gratifying to remark, that although the present subsidence of the embankment is within but 15 feet of one of the great reservoirs belonging to the East London Water Works Company, I have succeeded in preventing any injury to it. The cutting from Angel-lane to the Ilford valley is opened the whole distance, and the ballasting and permanent way formed, all but 20 chains. The embankment over the Ilford valley has been completed for more than six months, the ballasting and permanent way laid. The cutting east of the valley, with the exception of a small portion in Curtis's field, and at the crossing of the Essex turnpike-road, at the eighth mile-stone, is open to the tenth mile-stone, and the permanent rail laid through Ilford for a distance of half a mile from the valley. About 10 chains east of this cutting, the gullet leading to the Chadwell cutting is open. The cutting from Chadwell to Whalebone-lane is completed, the road ballasted, and the permanent way laid. The embankment at Whalebone-lane, extending towards Romford, is completed, and the permanent way laid for a distance of 60 chains. In order to expedite the formation of this embankment,

a side cutting, contiguous to the Barrack Field at Romford, has been opened. I therefore anticipate that the whole embankment up to Romford will be completed in less than six weeks. Up to this point, the masonry commencing at the east end of the London viaduct is complete, consisting of the numerous bridges over the rivers, and over and under the turnpike and occupation roads, amounting in all to forty-three, many of them of considerable magnitude, involving great expense in the construction of their foundations. Continuing east of Romford, several other important works are completed. In addition to these works, the station at Angel-lane, Stratford, with the engine-houses, coke-sheds, and water-tanks at Whalebone-lane and Ilford, are nearly complete. The whole of the line east of Romford, extending as far as Springfield, two miles from Chelmsford, being thirty-one miles from the terminus at London, is let to respectable contractors, with the exception of the summit cutting at Brentwood and Mountnessing, and the Shenfield and Mountnessing embankments. The contracts between Romford and Brentwood have been let nearly six months, and the various cuttings, embankments, and other works at Hare-street, Hare-lodge, Gubbings, Brook-street, and Brentwood, are now in active progress, having been materially retarded by the weather. The contract drawings from Springfield to Colchester are nearly ready for advertising. In order to ensure the early completion of the works, six locomotive-engines are employed day and night. Six passenger-engines will be ready within one month from the present time, when also a sufficient number of first and second class carriages will be completed. A large supply of rails and chairs have been delivered, sufficient for upwards of sixteen miles of double line. Plans and drawings for a complete London station, constructed in accordance with the experience hitherto gained, have been prepared ready to proceed with the works, when directed, for the entire opening of the line to Shoreditch.

I am, Gentlemen, your obedient servant,

Engineer's Office, 25th February, 1839.

JOHN BRAITHWAITE.

Balance Sheet, 4th January, 1839.

Dr.	£.	s.	d.	£.	s.	d.
To capital stock.						
Number of shares subscribed for, 64,000 <i>l</i> .						
less 1,679 <i>l</i> . shares not taken up				62,321	0	0
For deposit on for the following calls on 62,321 <i>l</i> . shares as above:—						
1st call, 1 <i>l</i>	62,321	0	0			
Less call on 1,978 shares re-purchased by the company, and arrears 1,613 <i>l</i> . 3 <i>s</i> . 9 <i>d</i>	3,594	3	9			
				58,726	16	3
2d call, 1 <i>l</i>	62,321	0	0			
Less call on company's shares, 1,978 <i>l</i> ., and arrears, 2,962 <i>l</i> . 10 <i>s</i>	4,940	10	0			
				57,380	10	0
3d call, 2 <i>l</i>	124,642	0	0			
Less call on company's shares, 3,956 <i>l</i> ., and arrears, 9,656 <i>l</i>	13,612	0	0			
				111,030	0	0

4th call, 2l. 10s.	155,802	10	0	
Less call on company's shares, 4,954l., and arrears, 34,863l.	39,808	0	0	
				115,994 10 0
5th call, 2l. 10s.	155,802	10	0	
Less call on company's shares, 4,945l., and arrears, 61,635l.	66,580	0	0	
				89,222 10 0
6th call, 3l. (due 10th January) . . .				661 0 0
Shares paid up in full, 5,550l., less sums taken credit for under calls, 2,223l. . .				3,327 0 0
Rents of surplus properties				487 13 5
Produce of old materials and crops sold . .				1,248 2 6
Interest on bankers' balance and calls paid after date				2,478 12 4
Advances from bankers				40,000 0 0
				<u>£542,877 14 6</u>

Cr.	To 4th July, 1838.			Total at 4th Jan., 1839.		
	£.	s.	d.	£.	s.	d.
By expenses incurred previous to ob- taining the Act of Parliament (in- cluding grant of 1,500l. provisional committee	39,598	8	11	39,623	8	11
Land and compensation to owners . . .	163,776	13	9	281,477	3	0
From Shoreditch to Cam- bridge-road £16,455	9	0				
Cambridge-road to Rom- ford	182,496	17	10			
Romford to Brentwood	14,096	18	1			
Brentwood to Chelmsford	34,911	15	7			
Chelmsford to Colchester	12,576	12	0			
Colchester to Yarmouth	9,176	0	0			
Surveyors' and solicitors' expenses	11,763	10	6			
	<u>£281,477</u>	<u>3</u>	<u>0</u>			
Engineering and works	86,128	4	3	187,661	2	5
Engineer's staff and surveying	16,526	19	11			
Permanent rails and chairs for 16½ miles, including spikes, sleepers, and switches	47,422	16	0			
Temporary rails, wagons, barrows, pumps, sun- dry machinery, and tools	7,393	11	5			
Locomotive engines	7,991	2	0			
Earth-work, masonry, brickwork, ballasting,						

and laying permanent way	107,471	11	0
Miscellaneous expenses	855	2	1

£187,661 2 5

Direction	3,703	19	4	5,286	19	4
Secretary, assistant, and clerks, their salaries	2,977	10	1	3,857	3	8
Engraving, printing, and advertising	1,395	8	1	1,562	1	7
Account-books and stationery	589	16	1	589	16	1
Offices Adelaide-place, housekeeper, porter, rent, rates, taxes, furniture, furnishing, &c.	2,888	3	8	3,791	12	8
Travelling expenses	688	6	2			
Carried to land and compensation, 498 <i>l.</i> 15 <i>s.</i> 4 <i>d.</i> , balance				766	16	8
Solicitors for general business				559	12	11
7,000 <i>l.</i> carried to debit of land and compensation.						
Miscellaneous expenses (including losses from defalcations of absconded clerks), 841 <i>l.</i> 9 <i>s.</i> 8 <i>d.</i>				1,047	17	0
Taking traffic	103	12	9	118	1	6
Agencies	88	11	11	88	11	11
Interest on bankers' and shareholders' advances				545	2	4
Balance				15,902	4	6
				<u>£542,877</u>	<u>14</u>	<u>6</u>

	£.	s.	d.	£.	s.	d.
To balance brought down				15,902	4	6
Further payments on account of 1st call				0	0	0
2d call				40	0	0
3d call				1,384	0	0
4th call				3,462	10	0
5th call				11,761	10	0
6th call (3 <i>l.</i>) on 62,321 shares	186,963	0	0			
Less 66 <i>l.</i> paid in advance at 4th Jan.; 5,961 <i>l.</i> due on company's shares; and arrears, 98,306 <i>l.</i>	104,928	0	0			
				<u>82,035</u>	<u>0</u>	<u>0</u>
Interest on calls paid after date				437	4	10
Sundries				177	0	0
				<u>£115,119</u>	<u>9</u>	<u>4</u>
Balance brought down				<u>£27,590</u>	<u>4</u>	<u>0</u>
				£.	s.	d.
By paid-off bankers' advances				20,000	0	0
Paid further on account of land and compensation—						
From Shoreditch to Cambridge-road	£25,284	2	2			
Cambridge-road to Romford	1,014	0	10			

Romford to Brentwood . . .	1,040	0	0		
Brentwood to Chelmsford . . .	0	0	0		
Chelmsford to Colchester . . .	100	0	0		
Colchester to Yarmouth . . .	0	0	0		
				27,438	2 2
Engineering and works				38,404	8 10
Sundries				1,766	14 4
Balance				27,590	4 0
				<u>£115,199</u>	<u>9 4</u>

COMMERCIAL RAILWAY COMPANY.—LONDON AND BLACKWALL.

Half-Yearly General Meeting held in London, Thursday, the 28th of February, 1839; WILLIAM ROUTH, Esq., in the chair.

REPORT.—The directors of the Commercial Railway Company have much pleasure in again meeting the proprietors, and of laying before them the results of their labours during the past half year.

Before proceeding, however, to the details requisite to show the progress made in the execution of the works, and the actual position of the finances of the company, the directors think the opportunity favourable for entering into a short review of the general objects of the undertaking, and for making particular reference to the application now before Parliament for an extension of the line.

It was part of the original design in the formation of the railway, to bring its London terminus as near to the centre of its commercial operations as circumstances would admit. Upon the first application to Parliament it was, however, deemed advisable in the committee, to limit the line to the confines of the city, in order to give time for the removal of certain prejudices which existed. The Act accordingly was passed for the construction of the line from Blackwall to the Minories, but with a distinct avowal on the part of the company, that they would apply in a future session for powers to carry into effect the original intention.

In the following session, accordingly, a Bill was brought in for the extension of the line into the city, and this Bill, after a protracted discussion, passed the House of Commons, and was read a second time in the House of Lords; when, owing to the demise of his late Majesty, Parliament was hastily dissolved, leaving insufficient time for the completion of the inquiry, and a short Act only was passed, enlarging the powers of the former Act, and by thus extending the time for taking of land, an opportunity was afforded for applying in a future session to gain the object desired, and on this occasion, the company obtained from the opponents, amongst whom was the corporation of London, a written undertaking that upon any renewed application to Parliament, the Bill should be unopposed by them, till it reached precisely the same stage as that in which it was arrested.

Since that period, the company, deriving experience from the developments that have taken place in railway practice, resolved to adapt the line to the use of stationary instead of locomotive power. The more the directors reflect upon this alteration as applied to the Blackwall line, the more are they satisfied of its complete superiority. The reports already made by the directors went very fully into this subject, and everything has tended to confirm the opinions which were then expressed.

The objections which were formerly urged as to danger from fire by

locomotive engines travelling through a populous district, and the annoyance they might occasion by their noise, smoke, and the blowing off steam, will be wholly obviated, as a train of carriages will traverse the line comprised in the extension, in one direction by its own gravity, and in the other by momentum, with less noise than carriages create upon a macadamized road, neither ropes, sheaves, or any other machinery being in operation, on the west of the Minories.

The directors have now, therefore, in pursuance of the original intention, and in compliance with the promise contained in their last report to the proprietors, renewed their application to Parliament this session, and their petition for leave to bring in a Bill, after full discussion, passed the Standing Orders' Committee, on Monday last. The directors see no reason to doubt their being able to prove to the Legislature, that the object is not only one of advantage to the shareholders, as a perfecting of the whole undertaking, but that it will be a great convenience and benefit to the public.

It will not be lost sight of, that the Blackwall Railway was first suggested as a remedy for relieving the port of London from the delays, dangers, and losses occasioned by the excessively crowded state of that part called the Pool, where the utmost confusion of steam-boats, sailing craft of all descriptions, besides barges and open boats, was daily witnessed, leading but too frequently to lamentable consequences in the loss of life and property. Although various regulations have been made by the proper authorities, they have almost wholly failed to afford the necessary protection from danger. The establishment of a railway from the City to Blackwall, capable not only of conveying the numerous passengers travelling daily between the two termini, and the great docks which lie immediately, but capable likewise of conveying the thousands of steam-boat passengers who travel up and down the Thames, was considered by Parliament the only means of meeting the difficulty, and of affording the remedy to the evil so much complained of. The steam-boat passengers, by embarking and disembarking at the commodious wharf adjoining the East India Docks, at which there is an ample depth of water at all times of the tide, would not only be spared the danger and inconvenience of the Pool, but would actually, in going and returning, save in time as much as an hour and a quarter, or an hour and a half, or considerably more, if the regulations adopted by the Corporation of London for the security of the public are strictly enforced. The case made out in the first application to Parliament was a very strong one, and so far from anything having since occurred to weaken it, it is well known that the steam-boat traffic has enormously increased, the vessels are of much larger size, and consequently navigate the river with greater risk to other craft, and especially to persons in open boats. The number of steam-boat passengers has, within three years, been little short of doubled. In the proportion of this increase is the necessity of the Blackwall Railway apparent on public grounds, while to the proprietors, an increased prospect of a profitable result may be fairly considered as the natural consequence.

One of the striking features of the undertaking is, the great facility of access which it will throw open to the mercantile interest connected with the East and West India Docks, possessing as these docks do, an almost unlimited means of accommodation, and water way, for the largest class of shipping. The railway will serve as a short path, and thus unite them directly with the heart of London. Other extensive business establishments have arisen at Blackwall, while new ones are perpetually rising; and it cannot be doubted that the bringing them within ten or twelve

minutes of the City, must be viewed as a measure calculated to increase the facilities of trade, and of giving enlarged extension to the port of London, called for alike by the increase of its trade and by its altered character.

It has been asked by some parties, whether advantages commensurate with the cost would be gained by the extension of the line by a quarter of a mile. To this it may be answered, that in a line of only three miles and a half, the additional quarter of a mile is a distance of importance, and moreover, that short distance would carry the terminus to the immediate vicinity of the great colonial market, and to a point exceedingly convenient for the multitude of passengers who will have to be accommodated.

Nothing can be more unreasonable than to assert, that the entrance of the railway within the City is calculated to impede the progress of those great improvements which the corporation is so laudably engaged in. The railway company have not heard of a single contemplated improvement that can possibly be interfered with by their works.

The report which the directors have received from the engineers relating to the progress of the works is as follows :—

“Gentlemen,—The whole of the works on your line of railway being now contracted for, with the condition, that the execution shall be completed by the end of the present year, it affords us great satisfaction to report, that looking to the progress which has been made by Messrs. Webb since the 1st of October, when they commenced their contract, and to the character and resources of the gentlemen who have contracted for the remaining portion of the line, we see not the least reason to fear that your expectations will be disappointed in respect of these engagements.

“On taking into account the united amount of these contracts, and adding thereto the cost of the permanent way, not included in them, we feel ourselves justified in stating our conviction, that the anticipated saving to be effected by the alteration of the width and levels of this railway, will be fully borne out by the result.

“The respective parties who are under engagements to furnish the engines for the working of the line, are actively employed in their construction, at the same time, they are also preparing the large drum and spur-wheels for winding the rope. We deemed it desirable to delay to the latest period (consistently with the early completion of the works) the specification necessary for the construction of this portion of the machinery, in order that we might avail ourselves of every improvement, which a continued and careful consideration of the subject could suggest.

“We have unqualified satisfaction in being able to state, after going into extensive detail on the subject of working by stationary engines, which we have had an opportunity of doing in the course of various inquiries and calculations, that the annual cost of working by the proposed system will be less by some thousands per annum than the amount assumed in our first report to you. We have now sufficient ground to satisfy our minds, that the annual cost of working your line will not exceed 8,000*l.* per annum.

“The foundations for nearly one-half of the whole viaduct are now actually completed, and the piers are most of them finished to the springing height, many of the arches are completed, and the centres removed, and we calculate that from this time seven arches will be turned weekly in Messrs. Webb's contract, and in the other contracts in the same proportion.

“The work it must be borne in mind has hitherto been done during the least favourable time of the year and under one contractor only, but

when the energies of two other contractors with ample resources shall come into operation, the works will be so accelerated as to leave no doubt of their being successfully terminated by the time specified.—We are, gentlemen, your very obedient servants,

(Signed) "G. STEPHENSON,
"GEO. P. BIDDER.

"*London, 25th February, 1839.*"

This report will sufficiently show the position of the company as regards the works on the line. The proprietors will not fail to participate with the directors in the satisfaction they feel in having thus to announce that the very reduced estimate of the engineers, laid before them in the month of February last year, for the construction of the works, will not be exceeded, while in the cost of working of the line there will be a saving of no less than 4,000*l.* per annum.

The purchases of land required for the works of the company under the first and second contracts are now complete. These contracts extend from near the Minories on the west, to the eastern side of the Regent's Canal in the Commercial-road, a distance of about one mile and three quarters.

Arrangements likewise of a very satisfactory nature have been concluded with the East and West India Dock Company, not only for the purchase of the property required for the railway, extending over a space of 1,300 yards, but for the use of the Brunswick Wharf; and this wharf as a terminus, instead of costing the company a large sum of money, will yield a considerable revenue, on the principle of a division of the wharfage for a lease of fifty years, as agreed upon with the dock company.

Settlements remain to be made over some portion of that part of the line lying between the Regent's Canal and the West India Dock-road, also in two or three cases at Blackwall, and a similar number near the Minories, in London, but as in all these cases the claims have been sent in and the property carefully valued, this department of the company's expenditure can be ascertained with a considerable degree of exactitude. It is most gratifying, therefore, for the directors to report, that the total cost of the property required will be about 224,000*l.*, being 40,000*l.* less than the estimate, a circumstance arising principally from the estimate having been made for a greater width of line than is now found necessary.

In estimating the value of the property to be disposed of, the directors have not taken into consideration the value of the arches, though they have the pleasure of stating, that applications have been made to take several of them on lease, and they see no reason to doubt that a considerable revenue will be derivable from this source, as the arches will be made water-tight, and will be well adapted for stabling, workshops, and stores.

The half-yearly account of the receipts and disbursements of the company to 31st December last will be submitted to the meeting in conformity with the directions of the Act. The promptitude with which the calls hitherto made have been responded to will be apparent when it is stated, that of the call due in July last only 228*l.* now remains in arrear, and of that due in October (the last that was made), 3,320*l.* is in arrear. These facts afford satisfactory evidence of the soundness of the proprietary.

After the business of this meeting is concluded, a special meeting will be held for the purpose of obtaining the sanction of the proprietors to the Bill now before Parliament, this formality being required in conformity with the standing orders of the House of Lords. It will be seen therein, that the company seek the necessary powers to raise money by mortgage as soon as 50 per cent. upon the estimated cost of the works has been

paid up. The proper steps have also been taken to reduce the number of directors to ten, in conformity with the suggestion of the board adopted at the last half-yearly meeting.

Since the period of that meeting, two vacancies have occurred in the direction, by the resignation of Mr. R. Green and Mr. W. Crawshay, who nevertheless both retain the same interest and bear the same good-will to the concern as ever. Two others, namely, Mr. Alderman Pirie and Mr. C. E. Mangles, go out of office by rotation, but being eligible for re-election offer themselves accordingly; while to supply the two first vacancies, Mr. Alderman Humphery and Mr. Thomas Hughes have been proposed; both these gentlemen went out of office by rotation on a former occasion. Thus the number will be completed which by the present Act must be kept up, till the sanction of Parliament is obtained for reducing it.

In conclusion, the directors renew the expression of their confidence in the speedy and complete accomplishment of the undertaking, and of its answering the high expectations they have always entertained both as to the utility of its objects and the profit it will yield to the proprietors.

London, 28th February, 1839.

WILLIAM ROUTH, *Chairman.*

MANCHESTER AND BIRMINGHAM RAILWAY.

Third half-yearly meeting held at Manchester, March 7th; THOMAS ASHTON, Esq., in the chair.

REPORT.—The directors beg to report that, since the meeting of shareholders in September last, the works upon the part of the line which had then been let—namely, between Manchester and Stockport—have been proceeding vigorously and satisfactorily; and there is every reason to believe, that the railway connecting these two important towns will be ready for the use of the public by the time contracted for—namely, in May, 1840.

The survey of the line between Stockport and Congleton, which was in progress at the period of the last meeting, has been concluded, and the line staked out.

But, for reasons adverted to on a former occasion, it is desirable to deviate from the present line of railway; and on that account the letting of the line between Stockport and Congleton, and beyond that place, awaits the result of the application now making to Parliament for power to effect this object. The postponement of the letting, however, involves no practical delay, inasmuch as the opening of the line must be dependent upon the completion of the heavier works of the Stockport and Congleton viaducts.

These viaducts the directors have consequently been anxious to place under contract; and the former of them was let to most respectable contractors upon the 13th day of November, and the latter on the 14th day of February last, at sums both within the engineer's estimate. The Stockport viaduct is to be completed in two years from the date of the contract; the Congleton in two years and a half from the like date.

In connexion with the application to Parliament, to which reference has been already made, the directors may mention that they also purpose to seek powers under their intended Act to extend the line of railway in the township of Manchester, by making an approach to the station from Ducie-street, Piccadilly. By the arrangements thus decided upon, the fullest facilities will be afforded to the traffic of the line; and the station of the railway, in point of public convenience and central position,

will, the directors believe, be the best which the town of Manchester presents.

The Bill now before Parliament has passed the standing orders, and Lord Francis Egerton has kindly undertaken the charge of it through the House of Commons. The orders of the Lords render it necessary to submit the Bill to a future meeting of shareholders for special approval, which meeting will be summoned at the earliest opportunity.

In reference to the next session, the directors have given notice of their intention to apply to Parliament for power to construct a branch to Macclesfield in substitution of that which the company are now authorized to make. That there are various objections to the present branch can scarcely be matter of surprise, when it is recollected that it was laid out as part of the main line of the late South Union Company, and converted into a branch whilst the Bill was before Parliament, rather as a guarantee to the town of Macclesfield, that a branch would be made for its accommodation, than as at all binding the company to the construction of the line as laid down in the Parliamentary plan. And the directors are happy to state, that by means of the proposed branch the public will have a better and safer line.

The public attention is now directed to the question of a junction of the termini of the railways entering Manchester; and the directors of this company, with a view to effect this object, and in pursuance of their declared intention of upwards of two years ago, have caused plans to be prepared of lines of railway branching from the station at Store-street, by which a junction with all the other railways terminating in Manchester will be effected. The advantages of a connecting line of this description, possessing good engineering properties, is too obvious to require further comment.

PURCHASES OF LAND.—The purchase of property is proceeding satisfactorily.

In some instances the directors have had recourse to a jury; but they have done so with reluctance, and only in cases in which the nature and extent of the claims made upon the company left them without an alternative. The verdicts thus obtained have realized a large saving to the company's funds.

The directors have also successfully resisted certain attempts to restrain the company by injunction from taking possession of land under the powers of their Act.

THE ACCOUNTS.—At the last meeting the directors submitted to the proprietors a statement of accounts commencing with the payment of the first call under the Act, and made up as the Act directs, to the 31st of July last.

At this meeting a similar statement of accounts will be presented for the half-year terminating on the 31st of January last.

The statement laid before the last meeting for its sanction could not properly comprise an account of the moneys received and expended antecedently to the passing of the Act, because it was matter of arrangement, when the amalgamation of the late Manchester South Union and Manchester, Cheshire, and Staffordshire Companies took place, that all accounts connected with the respective companies, from the year 1835 to the close of the session of 1837, should, so far as related to each company, be adjusted and settled under the authority of its own provisional committee. These accounts may be inspected by the shareholders of the respective companies, on application to Mr. Ellis and Mr. Foss, the late secretaries to the Cheshire Junction and the South Union Companies.

THE EXTENSION RAILWAY.—This is a subject to which the directors do not intend now particularly to advert, as they deem it better to await the

result of the investigation which is proceeding upon the subject of the Standing Orders, before they enter (as it will then be their duty to do) into a public statement of the sort of opposition they are encountering, and of the parties by and for whom it is promoted. To all who are acquainted with the Standing Orders, it is perfectly well known, that a literal compliance with them is not attainable; but it has never happened, until this occasion, that the orders, which were intended for the protection of landowners, and to see that due information was given to them of the intended interference with their property, should be used, as they now are, not by the landowners, for that wholesome and legitimate purpose, but by a combination of railway and canal companies, as a means of preventing inquiry into the merits of a proposed public measure.

The directors are sanguine in their expectation, that this attempt will signify fail; but they do not disguise, that the species of unworthy warfare, to which their opponents have resorted, is a source of much expense and annoyance.

THOMAS ASHTON, *Chairman*.

Mr. BUCK, the engineer of the company, then read his own report, of which the following is a copy:—

To the Directors of the Manchester and Birmingham Railway.

Gentlemen,—In accordance with your instructions, I submit the following report on the progress and state of the works. Those parts of the line which are contracted for and in progress extend from Fairfield-street, in Manchester, to the south side of Daw Bank, on the Cheshire side of the river Mersey, at Stockport. This distance is divided into five contracts, which are separately noticed as follows, viz. :—

Contract No. 1, or Fairfield-street Contract.—Commenced August 14th, 1838. Time of completion, eighteen months. This contract is 1,155 feet in length, and comprises the first portion of the viaduct by which the railway leaves the depot in Manchester. It consists chiefly of arches of brick-work, varying in span from 30 to 45 feet, and of one cast-iron arch of 128 feet 9 inches span. The progress hitherto made is consistent with the work being completed within the specified time.

Contract No. 2, or Chancery-lane Contract.—Commenced August 14th, 1838. The time for completion is eighteen months. This contract is 2,136 feet in length, and consists of the second portion of the viaduct by which the railway leaves the town of Manchester. The contractor has not yet had possession of all the land, but is expected to have it in the course of a few days hence, and the whole will be completed with ease in the specified time.

Contract No. 3, or Hyde-road Contract, is 1,900 feet, and comprehends the third or last portion of the viaduct issuing from the town of Manchester. It is not yet commenced, by reason of the obstacles which have hitherto prevented the company from obtaining possession of the land; but, as it is expected that the contractor will have possession in the course of a few days, such arrangements will be made as will ensure no delay arising from this unavoidable postponement of operations in this part of your works.

Contract No. 4, or Heaton Norris Contract, extends from the Hyde-road at the south-end of No. 3 contract, to near the right bank of the river Mersey at the town of Stockport; its length is 4 miles 26 chains. It also includes the ballasting and laying of the permanent way upon contracts 1, 2, and 3. It dates from September 11th, 1838, and the time of completion is 20 months. The heaviest work on this contract is a cutting of 409,000 cubic yards, the whole of which is to be carried to embankment; and 350,000 yards of this quantity are to be carried in one direction. About 80,000 yards have been already excavated. The contractor is proceeding

actively and judiciously; on the 18th of this month, he will commence night-work, and he is making such arrangements as will enable him to calculate upon completing the embankment to the end of the third contract by November next, when he will be ready for laying three miles of the permanent way; and there appears to be little doubt of his performing his contract in the specified time, namely, by May, 1840.

Contract No. 5, or Stockport-viaduct Contract, dates from November 13th, 1838. The time for completion is two years. It consists of a viaduct of 22 arches, of 63 feet span each. The first stone of this structure has been laid to-day, and the contractors are making arrangements for proceeding vigorously with their work.

Contract No. 6, or Congleton Viaduct Contract. This work has just been let, and is to be completed in two years and a half. It consists of forty-two arches, each of sixty feet span. Preparations have commenced by throwing up clay for making about 15,000,000 bricks, during the present year.

This work is that which may be expected to require a longer time for execution than any other on the line; and therefore its being now commenced will facilitate the making of such arrangements in the future lettings, as will tend to bring all the other parts of the railway towards completion nearly at the same period.

I am, gentlemen, your obedient servant,

Manchester, March 6th, 1839.

GEORGE W. BUCK.

Mr. JAMES WHEELER then read the following statement of accounts, from 1st August, 1838, to 1st January, 1839:—

Statement of Account from August 1st, 1838, to January 31st, 1839.

RECEIPTS.		£.	s.	d.
Aug. 1st. Balance brought forward		32,671	17	0
Cash per first call, £2 on 752 shares, £1,504, including six shares new allotment, £5 deposit, £30		1,534	0	0
Cash per second call, £3, on 25,456 shares		76,368	0	0
Cash per third call, £5, on 14,529 shares		72,645	0	0
Interest on calls		317	11	10
Bankers' interest		416	11	10
Cash for building materials and rents		1,302	0	4
Cash from contractors for bricks		2,927	2	0
		<u>£188,182</u>	<u>3</u>	<u>0</u>

DISBURSEMENTS.

	£.	s.	d.
Engineering and surveying	4,630	1	4
Land and compensation	100,676	9	0
Stamps	1,250	0	0
Office expenses	268	18	3
General law charges	1,400	0	0
Advertising and printing	423	5	11
Reference taking and notice serving, deviation line	190	1	0
Stock, viz. bricks, furniture, &c.	7,224	15	0
Direction	1,000	0	0
Locomotive engines	2,400	0	0
Travelling expenses	550	16	4
Juries	1,507	12	2
Works	16,098	2	5

CALCUTTA AND DIAMOND HARBOUR RAILWAY. 169

Manchester, Cheshire, and Staffordshire Railway

Company	2,000	0	0
Amount of call overpaid	7	0	0
Bankers' commission	248	8	5
Balance in company's favour	48,306	13	2
	<u>£188,182</u>	<u>3</u>	<u>0</u>

CALCUTTA AND DIAMOND HARBOUR RAILWAY.

REPORT of W. D. HOLMES, Esq., C. E. to the Provisional Committee.

GENTLEMEN,—In compliance with your commands through Mr. Horneman, I have entered into a careful investigation of the practicability and advantages of a railway between Calcutta and Lacam's Channel, or Silver-tree Point. From the survey and details submitted for my examination by Mr. Horneman and others, the conclusion I have come to is, that it does not appear to me expedient, at present, to form a railway from Calcutta to Lacam's Channel, but that one might be constructed between Calcutta and Diamond Harbour, a distance of 25 miles, that would ensure a very liberal return for the investment, and confer infinite benefit on the mercantile and shipping interests connected with the trade to Bengal, and on the city and trade of Calcutta especially.

The distance between Calcutta and Lacam's Channel is 39 miles; about 20 miles of this, nearest Calcutta, is particularly favourable for the construction of a railway; the nature of the ground, and circumstances generally, afford means for calculating the cost with precision. This part of the line, with the exception of Tolly's Nullah, is free from creeks or obstructions of any kind; but the remaining distance to Lacam's Channel presents altogether another feature: and although I have sufficient information to see that a very large outlay would be required for the construction of a railway to continue the line to Lacam's Channel, I have not sufficient data to form an estimate that would give any approximation to the real cost.

Diamond Harbour, below the most dangerous and tedious navigation of the river Hoogly, is now the anchorage for a considerable portion of the ships employed in the trade of Calcutta, for which it is well adapted, its position offers great facilities for improvement, so as to be adapted for loading and discharging ships of the largest size, with great despatch.

From Calcutta to Diamond Harbour there is an embankment which has been raised above the rise of the floods to form a military road, but which is little used, and would most probably be given by the Indian Government free of any cost, except certain service of a trivial and inexpensive character by the railway company when completed. This embankment is very straight, about 12 yards wide at the top, and in tolerable condition; and at a small expense, it would receive rails on a dead level from end to end. Between the city of Calcutta and Diamond Harbour, no bridge would be required, except at Tolly's Nullah. The embankment would admit of a double line of ordinary railway, but it is doubtful whether a sufficient space would be left between the outer rails and the slope on each side, to secure the bearers and ballast of the rails against the wash caused by the periodical rains; and to widen the embankment would not only incur a considerable expense, but its settlement and union with the old work would, with the best management, cause much uncertainty and probably inconvenience, long after the line was at work. I therefore recommend a single line of railway of seven feet gage to be laid along the middle of the embankment, with an extra line for a short distance at a station half way, and two other intermediate

turn-out slips on which it may be arranged for the slow trains to wait for the passing of the quick ones, should it be necessary for them to start before the quick trains, but which will hardly be the case, as the short distance of 25 miles, under ordinary management, run to and fro alternately on the same line, will probably be always adequate to the communication: if, however, hereafter the extent of traffic should render it otherwise, it will then be time enough to make other arrangements, or to increase the width of the embankment for a second line of rails. I shall, therefore, confine my estimate to one line only, and suppose the embankment will be given to your committee, of which there appears to be little doubt.

Estimate, &c.

Trimming and ballasting the bank, and its preparation for the rails, at 400 <i>l.</i> per mile for 25 miles	10,000
Timber, longitudinal wood bearers, kyanized, and fixed with transverse bearers and diagonal braces, at 20 <i>s.</i> per yard run, complete	44,000
Rails, at 60 <i>lbs.</i> per yard, 2,600 tons, including passings and stations, at 18 <i>l.</i> per ton, delivered along the line	46,800
Switches, turn-plates, spikes, fixing, and sundries	5,500
Midway station	1,000
Contingencies	22,700
Extra allowance for bridge over Tolly's Nullah, 40 ft. span, and short distances to the bonded warehouses at Calcutta, the land of which must be purchased, and the cost of which can be only approximated—say with station at Calcutta	15,000
Quay, 200 yards run on the shore at Diamond Harbour, with station and small warehouses	20,000
Engines and carriages at commencement	15,000
Engineering, surveying, superintendence, &c. &c.	20,000
	<hr/> £200,000
Five steam tugs	50,000
	<hr/>
Total	£250,000

It will be desirable at an early period after the completion of the railway, to construct docks at Diamond Harbour; but I contemplate that they will be required, with bonded and other warehouses, on a scale that the public would not be disposed to entertain, if brought forward, at the present period: and as the docks and warehouses, however important to the general plan, are not necessarily connected with the railway, it is not material whether they are constructed by a separate company, or by a future extension of the powers of the railway company.

Two or three years will considerably advance steam navigation, and render great changes necessary for their accommodation; the delay, even on this account, may be of great advantage to any plan for docks at Diamond Harbour.

I have calculated on the railway being connected with the bonded warehouses now erected at Calcutta, by Tank-square, so that goods conveyed by the trains will come underneath their cranes: this would effect great mutual advantages, and the sooner negotiations are opened with the directors of the bonded warehouses, the better.

We have now to consider the probable returns for the above investment of 200,000*l.*, exclusive of the 50,000*l.* for steam-tugs, which I conclude will pay their own charges. It is not necessary that I should enter into any detail of the difficulties of the navigation of the Hooghly above Diamond

Harbour, with which you are well acquainted; not only do difficulties exist to occasion a very great annual sacrifice of life and property, but the impediments are of a very serious character to the trade of Calcutta,—ships which discharge and load at Calcutta incur a very heavy expense in pilotage, towing, &c. which amounts to at least 10s. per ton up and down the river, or 5s. each way. A very large portion of the goods are conveyed by Bhurrs and small-craft to the ships at the new anchorage at Saugur. The rate of 5s. per ton on the shipping has been proved to be a very moderate estimate, to take the whole trade of Calcutta, which, according to official reports, amounts in round numbers to 400,000 tons a-year, taking the imports and exports.

We will, however, suppose that some of the smaller craft might continue to sail direct to Calcutta, and some part of the goods remain warehoused for re-exportation, for which deduct one-half, we shall then have a traffic by railway of 200,000 tons of goods a-year, which I would take at 2 rupees or 4s. 4d. per ton, including quay-dues, wharfage, &c., which would be nearly 2½d. per ton per mile on the line, and which would be a saving of 8d. per ton on the charge now incurred, and a great saving in time,—say,

200,000 tons of goods at 2 rupees, or 4s. 4d. per ton . . .	£43,333
Passengers and crews of vessels, 12,000, at 2 rupees, or 4s. 4d. each	2,600
" " 24,000, at 1 rupee, or 2s. 2d., each	2,600
Country passengers and traffic*	2,600
	<hr/>
	£51,133

Deduct for management, transit charges, and current expenses, wear and tear, &c. &c. one-third	17,044
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Profit . . . £34,089

We have therefore a profit of nearly 17 per cent., after deducting all charges; lower rates can therefore be afforded, which would secure a larger amount of traffic.

The rate of transit charges, wear and tear, &c., will be found liberal, when it is considered that good coals can be had for 12s. per ton at Calcutta, and the native workmen's wages are not more than 4d. to 8d. per day. Whatever view is taken of the subject, a very liberal profit is secured, and benefits conferred on the trade of Calcutta, and shipping, which can only be appreciated by the shipowner and merchant, or one who has fully entered into the details of the question. The embankment and the formation of the line being already nearly in a fit state to receive the rails, there is not that uncertainty of cost to which in some degree all railway lines which have long excavations and embankments are necessarily subject.

The rails I propose to be 60lbs. per yard, which are much heavier than rails laid with longitudinal bearers in this country; but the light work in all railways, is the main cause of the great wear, tear, and maintenance. This evil I would avoid; the extra first cost will be the cheapest.

* I have no data on which I can form any certain estimate of the number of country passengers, or of the repeated journeys of those connected with the shipping; but experience has shown the effect of railways in creating passenger-traffic, so as to exceed the income of all other sources of profit, even when there could be no passenger-traffic estimated. We have every reason to expect the same result in the communication between the metropolis of British India and its port at Diamond Harbour.

I propose that your company be provided with five powerful iron steam towing-vessels, for the purpose of towing vessels as they come in and go out; the general or established station of some of them, when unoccupied, to be within the mouth of Channel-reach, where there is, by the report of Capt. Lloyd, deputy marine surveyor-general, 2 fathoms at the entrance of this Channel north of Saugur Island. This plan suggests another, which every mariner will promptly appreciate.—When an inward-bound vessel is nearing the Sand-heads, she would hoist her signal for a pilot and steam-boat; this in a few minutes is semaphored to Kedgerree, and a steam-tug would go down for her forthwith: whereas, by the present plan, a ship is semaphored to the city, and a steamer has then to be sent a distance of perhaps 80 miles to meet the ship,—hence an additional expense of one day, often two, (400 Rs.) and unnecessary wear and tear of steam-boat property, so valuable in India. The marine survey of Diamond Harbour and Adjipour Nullah, furnished to Mr. Horneman by Capt. Kirby, harbour master, I have also carefully examined, and by it there appears no difficulty; but, on the contrary, it presents every facility for taking in a ship at any time of the tide, should it be requisite, with the improvements which I suggest.

By the present plan, a ship's cargo is first put into Bhurrs, then landed and put into Hackrey carts, and conveyed to the Godowns. By railway conveniences, the same crane which hoists out the cargo will deposit it in the wagons on the railway at Diamond Harbour, and from thence it will be conveyed to the bonded or other warehouses at Calcutta; and as it is proposed the line should terminate under the cranes of warehouses, the cargo would be housed at once, without any other remove, and consequently effect a great saving of expense and time, and avoid much damage to the goods.

I have the honour to be, Gentlemen, Your most obedient Servant,
No. 5, Canon-row, Westminster, 28th Nov., 1838. W. D. HOLMES.

COPY OF CAPTAIN J. T. BOILEAU'S REPORT.

I have perused the copy of Mr. Holmes' report, forwarded to me through Mr. Horneman, and am of opinion that the view which he has taken of the practicability, use, and advantage of forming a railpad from Calcutta to Diamond Harbour is just, and in its details, generally correct;—there are several of the minor points in which my opinion may differ from the statements contained in the report, such as the amount of tonnage of the port of Calcutta, and the details of the expense in the estimate:—but, as I should rate the former above what Mr. Holmes makes it, and bring the estimate of the expense somewhat lower, the difference of our opinions (which might however be made to agree, had we the opportunity of going through the documents from which the report was drawn up, together,) does not in any way affect the practicability, usefulness, or profit to the company of the scheme, which has my cordial wish for a speedy commencement, as it will, in my opinion, be sure of a successful issue.

J. T. BOILEAU, *Captain Bengal Engineers.*

Somerton, Bury St. Edmunds, 5th February, 1839.

NEWCASTLE AND CARLISLE RAILWAY.

Annual meeting held at Newcastle, March 19th, 1839, Matthew Plummer, Esq., in the Chair.

REPORT.—The directors feel great satisfaction in meeting the shareholders, to lay before them a statement of the progress made during the last year, towards the completion of this great undertaking, and to point out the

cheering prospect now opening on their view. With reference to that prospect, they considered it their duty to make a communication, by letter, to each shareholder, and to state the course which the great improvement in the revenue of the company would enable the directors to recommend to the annual meeting for adoption. The principal object of the directors, in making that communication, was, to give to the shareholders some means of forming a correct estimate of the value of their property.

A variety of unforeseen causes, principally relating to unavoidable delays in arranging for the purchase of properties required for the line, have prevented the opening of the different portions of the railway at the precise periods calculated upon by the directors. But they have now the satisfaction to inform the shareholders, that, from the state of the works, as detailed in the report of the managing committee, little doubt need now be entertained, but that, very soon after midsummer next, the last remaining portion of the railway will be completed, and the line then brought from Bladon to its present intended terminus, in the immediate vicinity of Newcastle. It will be seen by the report of the managing committee, that when the works mentioned therein are completed, 46 miles of double line will be finished, leaving 20 miles only of single line. This 20 miles of the single line the directors recommend should also be made double, as speedily as possible.

The directors, in their last year's report, drew the attention of the shareholders to the great improvement in the line which they had acquired the power to make on the north banks of the Tyne, by an arrangement for the purchase, on fair terms, of the land required for the purpose. On this land, near the lead-works of Messrs. Walker, Parker, and Company, the principal depot for Newcastle will be placed; from which, to preserve a communication with the original Parliamentary line, an inclined plane, to be wrought by a fixed engine, will be made from east of the Newcastle subscription water works, to the intended new quays, on the shores west of the Skinner Burn, and to the depot there, for the convenience of the trade of the river, and the lower parts of the town; thus making the main depot useful for all purposes. These arrangements have occupied much of the time and anxious consideration of the directors, and have been determined upon as the best in all respects for the interests of the company; as, by these means, passengers will be brought at once to their destination by locomotive power, and without the intervention of an inclined plane, as was originally contemplated.

The directors can assure the shareholders, that their railway is, in the opinion of persons highly competent to judge—and which opinion is confirmed by the statements in the report of the commissioners on Irish railways—one of the best-constructed railways in the kingdom, taking all circumstances into consideration; and that it has cost much less than any other similar work. They therefore feel that they can now congratulate them on the unquestionable prospect of the entire success of the undertaking, and upon the immediate realization of a return upon the capital embarked. The directors are aware that many may complain of the length of time which has elapsed between the commencement of the work, and the opening of its present bright prospect; but it must not be forgotten, that the work was begun at a time when railways were not regarded in the favourable light they are in the present day; and that from causes, which they are at a loss to discover, the Newcastle and Carlisle Railway was not appreciated by the public in the way which it is now evident it deserved to be; and further, that having been commenced on a plan calculated for the conveyance of mineral and agricultural produce, and general merchandize, by the application of horse-power, the capital deemed needful was very

materially less than that which was necessarily required for locomotive power, with all the contingent arrangements for the quick transit of passengers. Much time was lost in surmounting the financial difficulties by which it became beset, some of which occurred at a period of great embarrassment in the commercial world. These evils, however, have not been unattended with some good, for they imposed upon the directors and agents of the company the necessity for that economy and care which, they can confidently assert, and as proved by the cost, has attended its progress throughout.

The prospects of benefit to the company, held out by the directors in their last report, as likely to result from the opening of the middle part of the line, have been fully realized. The mail is now conveyed twice daily between Newcastle and Carlisle; and this railway is adopted as the shortest route, in point of time, to and from the Metropolis, Liverpool, and Manchester, and most parts of the populous manufacturing districts on the west side of the island. Persons quitting Newcastle on one evening are enabled to reach London on the following; being conveyed from Carlisle by coaches to Preston, where they join the London train. The above journey will be much expedited by the opening of the railway from Preston to Lancaster, which is expected to take place shortly.

Further beneficial results are also looked for by the near approach of the completion of the Brandling Junction Railway, opening out, as it will do, the communication below Newcastle for the shipment of coal, and affording the means of transit of passengers and goods to and from its different termini at Sunderland and South Shields; and also from the opening of the Newcastle and North Shields Railway, which, although it does not effect an immediate junction with the Newcastle and Carlisle Railway, will doubtless cause a considerable increase in its revenue, by the facilities it will afford to parties from the west going to the populous and thriving town of North Shields, and to that delightful and much-frequented watering-place, Tynemouth, and its neighbourhood.

In addition to the lines of railway in progress south and east of Newcastle, as mentioned above, your directors have great pleasure in drawing your attention to the prospective benefits that will result from the railways now in progress, and projected, to communicate with the west-end of your line, viz., the Carlisle and Maryport, now in course of execution; and the Carlisle and Penrith, for which plans have been prepared, and a company is in the course of formation.

Various projects for a railway communication between Newcastle-upon-Tyne, Edinburgh, and Glasgow, have, during the last two years, been brought before the public, and also been recommended to the notice of your directors in various shapes, although not until lately in such a way as to engage much of their attention. But Acts of Parliament being obtained, and the works being in progress for lines of railway which will shortly connect Newcastle with the southern parts of England and the metropolis, it became evident that the same mode of communication must shortly be continued from Newcastle to Edinburgh and Glasgow.

At a meeting held in Newcastle in August last, by parties desirous of forwarding a railway between Newcastle and Edinburgh, it was resolved, that an eminent engineer then present should, for the future guidance of the parties interested, examine into, and report upon, the different ways that had been suggested. But it subsequently appearing that a line by the east coast had been laid down and recommended for adoption, without much examination of any other, and as the directors had reason to believe that a line could be obtained more convenient to the public, of greater

benefit to the country in general, less costly, and likely to yield a larger revenue to the parties who might become the shareholders, they deemed it their duty, with a view of promoting an object so important to the interests of this company, to give directions to their engineer, Mr. Blackmore, to make an exploratory survey for an inland line of railway between Newcastle and Edinburgh. The result of that survey has, with the concurrence of your directors, been communicated to the public in an able report by the above gentleman, who proposes that the line, after taking the Newcastle and Carlisle Railway for above 20 miles, should then branch off to the west of Hexham, thus leaving only 96 miles of railway to be formed in order to communicate with the city of Edinburgh, of easy execution as to expense, and the gradients varying from 10 to 30 feet per mile, the latter only for about 9 miles in length on one portion of the line, and in another for $4\frac{1}{2}$ miles, being more favourable than those of the Newcastle and Carlisle, or of the Liverpool and Manchester Railways.

The table of tolls and rates will be laid before the shareholders for their approval.

The following statement, made up from the weekly summaries, will show the increase of revenue derived from various sources during this year over the last, although the middle portion of the line was only open for traffic since the 18th June last:—

Passengers exceeding	24 per cent.
Parcels do.	49 per cent.
Goods do.	49 per cent.
Coals do.	33 per cent.
Lime do.	$7\frac{1}{2}$ per cent.
Lead do.	11 per cent.
Stone do.	20 per cent.

And although the improvement in the general revenue is of so marked a character, yet the directors do not hesitate in expressing their unqualified opinion, that the future increase will continue to go on in a corresponding favourable ratio.

The shareholders are aware that it was originally intended that they should receive after the rate of 4*l.* per cent. upon the moneys advanced by them, from the dates of the payments of the respective calls. This system was pursued and the interest was paid up to the 31st December, 1833, from which time it was abandoned, and all the resources of the company have been since applied to the completion of the works. It was, however, determined, that an interest account should be calculated up to the 3d January, 1837, when the last instalment on the quarter shares was payable, and that a debenture should be given to each shareholder, setting forth the amount due, and whereby such sum, together with interest thereon at 4*l.* per cent., should be guaranteed to be paid previous to any division of profits in the shape of dividend;—all the shareholders being by this arrangement placed upon the same footing.

Since that period, the works have been progressing efficiently and satisfactorily as regards their construction, the revenue beyond what was required to defray the expenses of carrying on the traffic having been applied towards those of the formation.

Referring to the amount of the receipts of the last year, the directors consider it would be unjust longer to delay paying a dividend to the shareholders; and having ascertained that with the balance remaining after all charges for the trade and interest on the moneys borrowed, payable during that year, have been discharged, the company are enabled to do so, they are induced to recommend that a dividend of 4*l.* per whole share should be

paid, and so in proportion upon the quarter shares,—the debentures given to the shareholders for interest up to the year 1837, being previously provided for.

In anticipation of these resources which the company possess under their Acts of Parliament, the directors are not only enabled to prosecute the works, but also to give to the shareholders the option of receiving payment of the amount of the principal and interest due on the debentures given for interest, either in cash or in debentures, bearing an interest of 5*l.* per centum per annum.

If the meeting deem it advisable that the interest debentures should be thus discharged, power should be given to the directors to act accordingly; after which the payment of the proposed dividend of 4*l.* per share may be made at such period as the meeting may choose to name.

In the formation of a railway of such extent as that between Newcastle-upon-Tyne and Carlisle, it will readily be conceived, that at various points deviations have been made beyond the Parliamentary limits with a view to the improvement of the line. It is, therefore, again necessary to apply to Parliament for an Act to sanction these deviations. Notice has been given of such application, and in the new Act clauses will be inserted to retain the powers of the present Act for an extended period, to allow the completion of any part of the original railway which it may hereafter be determined to execute.

The PASSENGERS, TONNAGE, &c., during the year 1838, have produced 61,255*l.* 12*s.* 9*d.* This Sum has been appropriated as follows, viz:—

<i>Paid for working the Railway and carrying on the trade of the Company.</i>		<i>£.</i>	<i>s.</i>	<i>d.</i>
For salaries		2,100	19	2
Labourers on the line		6,002	6	11
Porters and labourers in depots		3,632	11	10
Guards		604	0	6
Enginemmen and firemen		1,939	17	0
Enginewrights, smiths, and other mechanics		2,055	5	11
Materials of various kinds for repairs; also, oil, grease, &c.		2,585	9	6
Coke		2,042	10	0
Incidental and travelling expenses		1,503	13	3
Poor-rates, &c.		781	3	8
Printing, &c.		294	15	4
Passengers duties (compounded for)		1,210	4	10
Road coaches, and tolls on ditto	£2,020 18 0 }	2,738	8	0
Steam-boats	717 10 0 }			
Amount paid for working the railway		27,491	5	11
Lent out of the profits towards the formation of the railway		32,834	9	10
Balance in the hands of the treasurer		929	17	0
		<u>£61,255</u>	<u>12</u>	<u>9</u>

General Account (for formation) to 31st December, 1838.

	Receipts in 1838.			Total Receipts.		
	£.	s.	d.	£.	s.	d.
Received proceeds on sale of Exchequer Bills	£162,917	7	4			
Less, so much repaid	15,000	0	0			
				147,917	7	4

Received for various
loans for the purpose
of carrying on the
works . . . 62,007 14 5
Less, so much repaid . . . 384 12 0

£61,623 2 5

Received for iron and other property
purchased by this company of the
Blaydon and Hebburn Railway
Company, and sold to the Brand-
ling Junction Railway Company .

19,923 12 1 81,546 14 6

0 0 0 9,000 0 0

Received by way of loan in anticipa-
tion of calls on shares under the
last Act . . .

70,100 0 0 70,100 0 0

Received for calls on original shares .

600 0 0 264,253 2 10

Produce on sale of forfeited shares .

0 0 0 24,117 8 3

Produce of quarter shares .

3,030 0 0 58,542 14 4

Produced by the sale of bricks .

0 0 0 76 9 10

Borrowed, out of the profits of the
traffic on the line . . .

32,834 9 10 77,958 1 1

Balance due to the bankers of the
company . . .

0 0 0 42,936 15 9

£126,488 1 11

£776,448 13 11

Payments in 1838.
£. s. d.

Total Payments.
£. s. d.

Paid for earthwork, masonry, drain-
ing, fencing, &c. . .

47,858 11 11 386,380 8 9

„ for iron rails, chairs, &c. . .

12,945 4 11 79,416 9 6

„ for stone sleepers, &c. . .

651 14 11 17,021 17 9

„ for providing and preparing ma-
terials for coating the way and
for laying the rails . . .

1,002 10 0 29,728 1 4

„ for tunnelling and bricks . . .

0 0 0 4,944 14 1

„ for carriage of materials and of
rails . . .

193 12 7 5,118 17 11

„ for purchase of land, and pay-
ment of damages, and for
timber trees . . .

15,959 8 2 75,910 1 4

„ for depots, stations, and ma-
chinery . . .

2,655 4 6 13,372 6 1

„ for engines, coaches, trucks,
lighters, horses, &c. . .

9,529 19 8 39,131 15 3

„ for engineering, surveying, &c. .

1,505 4 9 18,098 12 3

„ for printing, advertisements, and
stationery . . .

167 3 4 2,378 3 7

„ for law expenses, including Par-
liamentary expenses, and con-
veyancing . . .

594 5 4 11,100 15 11

178 SCIENTIFIC AND MISCELLANEOUS INTELLIGENCE.

„ for incidental charges, including office charges, rents, salaries, travelling expenses whilst on deputations, visits to the line, expenses on opening the railway to Hexham, to Haydon bridge, to Carlisle, to the Canal basin at Carlisle, to Redheugh, and to Greenhead; also, expenses on obtaining exchequer loans, &c.	5,372	13	2	19,159	16	8
„ for interest on Exchequer loans	6,640	0	0	26,490	0	0
„ for interest, being balance of account paid to shareholders and others	9,581	18	3	25,208	5	7
„ for instalments paid to Exchequer loan commissioners	7,500	0	0	15,000	0	0
„ for sundry payments made to contractors, &c. towards the completion of the line from Blaydon to Redheugh	2,407	8	11	22,988	7	11
„ for paid in reduction of loans	384	12	0	0	0	0
„ in reduction of banker's balance	1,538	9	6	0	0	0
	<u>£126,488</u>	<u>1</u>	<u>11</u>	<u>£791,448</u>	<u>13</u>	<u>11</u>
Less, repaid Exchequer Loan Commissioners				15,000	0	0
				<u>£776,448</u>	<u>13</u>	<u>11</u>

SCIENTIFIC AND MISCELLANEOUS INTELLIGENCE.

Crosley's Pneumatic Telegraph.—A model of this invention, mentioned in our last, is exhibiting in the Polytechnic Institution, Regent's-street, which seems to answer very well. It is not to be compared in point of rapidity with the ordinary telegraphs by sight and signals; but if friction and leakage do not injuriously interfere in long distances, we really think it may be very usefully applied for railways and many other purposes. The apparatus above mentioned, consists of two upright cylinders about 3 feet high, one at each supposed station. These cylinders have stop-cocks at their bottoms opening or not to the atmosphere, and each a tube issuing from the bottom which at a little distance branches into two. One of the branches communicates with an upright stand, carrying at the top a part of a barometer tube closed above, and partially filled with a coloured liquid, on the side of which is a scale divided into 10 parts. This may be called the signal tube. By means of stop-cocks, one before and the other behind it, the air pressing on this coloured liquid may be put in communication with, or shut off from, the air in the main cylinders at either station, by either of the branches before mentioned, which branches are continued of course throughout the distance. Near the top of the main cylinder is the recipient for the signal weights, fastened by some flexible

material to the circumference of the cylinder, so as to confine the air beneath from communicating with that above, and of course rendering it capable of being compressed by the weights. This recipient carries with it an upright scale by the side of the cylinder, which, rising or falling as the recipient does, tells the quantity and elasticity of the air beneath. Besides these things there are a whistle and another stop-cock near each end of the other branch not passing through the signal stand.

When a signal is to be made, the cock before the signal stand is shut, which cuts off all communication with its main cylinder, and the one behind it and in the branch is opened, which puts the stand in communication with the other station. A weight then put into the recipient raises the coloured liquid at the other station, shortly after, to a height corresponding with the weight. Thus the signals are made. Besides what we have stated there are other contrivances for different purposes, but our description, we believe, contains all the main features.

SEA-STEAMERS.—*The Great Western and La Véloce.*—The Great Western has cleared a profit of 9 per cent. in the first year, and on going into dock has proved the excellence of her structure by not having a wrinkle in her copper, notwithstanding the rough weather she has experienced. The French have successfully made a voyage with a much smaller vessel, *La Véloce*, of 220-horse power, and, we have heard, of only 600 or 700 tons, from Rochefort to the Havannah, 5,550 sea miles, in 29 days 16 hours, or, subducting two stoppages of 18 and 12 hours to take in a pilot, and for time lost to enter the Havannah in daylight, in 28 days 10 hours. This is at the mean rate of 64 marine leagues per day. In comparing the performance of this vessel, which is highly creditable, with that of the Great Western, our ingenious neighbours make the Great Western of necessity to stop at New York, and lose 8 days to take in a fresh supply of coal, one half of which they allow her to consume in the rest of the voyage. By this means they make out the voyage, including 1 day 6 hours for loss of time as before, 31 days 6 hours, instead of 29 days 10 hours, and the consumption of coal 900 tons for the Great Western to 200 for *La Véloce*. Now we admit all this, except the data and conclusions. First of all, the Great Western does not consume 40 tons of coal a-day, but somewhere, we apprehend, under 30, or about 25. Secondly, we do not see why she must stop 8 days, or even at all, at New York, as our belief is, that she would carry quite fuel enough for the whole distance. Thirdly, instead of 500-horse power, she is only 450. The comparison then stands thus:—To take about twice the tons 215 miles (her mean rate per day—see *Railway Magazine*, vol. iv, p. 420), the Great Western consumes about double the fuel which the *La Véloce* does for 192 miles, her mean rate. We presume this turns the tables.

However, the *La Véloce*, by what we have since heard from a private quarter, is most ingeniously contrived for the purposes of combining a sailing and steaming vessel. She is provided with the means of carrying almost any quantity of sail at pleasure, from that of a first-rate ship downwards. Her masts are iron cylinders one sliding within the other like the tubes of a telescope. When there are fine light winds she slides out all the tubes, and spreads every stitch of canvass before them. In stronger winds she slides down her top masts and carries less, and so on. When a sailing-vessel, she discontinues her steam and lifts up her paddles. Her yards too, we understand, have a joint in the middle, so that their ends can be dropped down to any angle by the side of the masts, by which the surface of exposed canvass can also be diminished at pleasure to

actually nothing. On the whole we understand she is a complete combination of a sailing-vessel and steamer, and can assume the character of either or both combined to perfection.

Daguerre's Photogenic Paper, and Fixation of Images.—M. Daguerre has communicated to M. Biot, his recipe for the preparation of his paper for taking images by the action of light. Dip unsized paper in muriatic ether weakly acidified by the effect of the slow decomposition which it experiences by time; or, what is better, apply this liquid with a soft brush to the paper and let it dry in the air, or with a gentle heat. This is very essential. Take then a solution of nitrate of silver in distilled water, which solution is necessary to keep constantly from the light in a bottle well stopped, and dip the dried paper which has been impregnated with the muriatic ether. This liquid may also be put on with a brush, but M. Daguerre disapproves of this, in consequence of being obliged to lay on the liquid in successive rays, the places where the edges of these rays touch or overlap, are in different physical conditions and dissimilar electric states, and thence but little sensible to the light. It is better, therefore, either to soak the paper as before or pour equally over one face of it the liquid. He then recommends the paper to be dried in the dark, or if it be accelerated by heat it must be by a very weak heat; for he says the radiation from non-luminous hot bodies, will, like light, tend to discolour the paper. He rather recommends pressure, and drying the paper between the leaves of a portfolio, which would not only exclude the light but the circulation of the air. M. Daguerre describes this paper as excessively prompt and sensible in receiving impressions if used shortly after it is prepared; but the longer the time the less sensible it becomes. The process may be stopped, and the image fixed by taking up the nitrate not yet entered into combination. This is done by bathing the paper in water enough to wash it well; then when it is thoroughly dried without heat, it is insensible to the further action of light.

Mr. Talbot's plan in this country is very similar to the above, but his process of fixation is different, but not so simple.

Communication of Motion.—It is said that M. Theodore Olivier, has communicated to the French Academy, an important improvement in the communication of motion by wheels. Without sacrificing any of the properties of the ordinary modes of communicating motion, he has contrived to turn two axles which are not in the same plane. "Hitherto when a machine offers two axles of this sort, we have recourse to a third communicating with the two first. This auxiliary carries two toothed conical wheels catching the teeth of two wheels at the other axles given." So that there are four wheels and three axles, while M. Olivier does it simply by arming each of the two given axles with a wheel.

Curious Phenomena.—The Abbe Moigno writes to M. Arago, that a violent explosion having taken place in their laboratory from a few grammes (each gramme is near $15\frac{1}{2}$ grains Troy) of a preparation of sulphur and phosphorus, he went immediately on hearing the noise to discover the cause of it, and found the atmosphere of the room perfectly transparent and inodorous, and could observe nothing to indicate the cause of the explosion. In a few minutes, however, everything was changed. The whole air of the room, though no fresh vapour had been disengaged, appeared to be filled with a nauseous fetid cloud, so thick that nothing could be seen across it. He explains this phenomena on the supposition, that at the time of the discharge, the vapour was rendered transparent and inodorous by its extension and temperature, and became visible and nauseous like some dry fogs have been observed to be.

Compost for Manure.—The following experiment has been tried by Mr. Payne, manager of the Polytechnic Institution, on a small scale. He mixed some leaves, saw-dust, and chopped straw together, which he well wetted with liquid ammonia, and put it into a bottle from Nov. 5, to Jan. 7th. Having now emptied the bottle, and turned it once or twice in the atmosphere, it became perfect mould. A quantity of sillex was mixed with it for the purpose of reducing its strength, and it was then too strong for vegetation. The proportions in the mixture do not appear to have been regarded. As the conversion into manure is so rapid, and the materials so easily attainable—for the ammonia may be had for taking away—the experiment may be well worth pursuing, especially where a fine rich soil is wanted for particular purposes.

Stephenson Memorial.—Mr. John Hinde, the Secretary to the Committee, has sent a letter to the "Mining Journal" of the 2d inst., complaining that (in the paragraph, which agreeably to his son's request, we inserted in the Magazine of last month,) the origin of the memorial is attributed to some individual without foundation, and that the design of executing it in cast-iron was not authorized by the Committee. He also corrects the error of the memorial being to Robert Stephenson, it is to George. We have carefully looked at our paragraph, which says that the design originated with the iron-trade itself, and consequently there is no assertion that it originated with an individual. Mr. Hinde also denies that the Committee have authorized the cast-iron plan, but both upon this and the preceding point we derived our information from his authority, the "Mining Journal," and with them therefore, rests the errors, if any.

Water-proof Cloth.—We are glad to find by the advertisement on our wrapper, that a cloth free from the objections of the Macintoshes, and with all their good qualities, has been manufactured. Ample trials have been made with the police, and a most satisfactory testimony, which we have seen, of its imperviability to rain, has been given by Colonel Rowan, the chief commissioner of this force.

Geology of February, from Wyld's Index to the Morning Papers.—The disturbances in the volcanic basin of the Mediterranean still continue, and have been accompanied by eruptions of Vesuvius, and earthquakes at Naples, on the 5th Jan., in the Scilly Isles on the 21st, at Smyrna on the 22d, and at Lisbon, two shocks on the 14th Feb. In the West Indian region on the 11th Jan., an extensive shock of an earthquake was felt at Martinique, where it has destroyed 800 human beings, £400,000 worth of property, and most of the towns and buildings on the island; its effects were felt but in a slight degree at Demerara, Trinidad, St. Lucia, Barbadoes, Mariegalante, Guadaloupe, and Hayti.

NOTICES OF WORKS.

We have before us the 2d vol. of the Transactions of the Institution of Civil Engineers—Bourne's splendid Lithographed Drawings of the London and Birmingham Railway, 2d Part—Roscoe's beautiful volume on the same—Davy's excellent Treatise on Artificial Foundations—that very useful and instructive book, the Year Book of Facts—the First part of a valuable Treatise on the Theory, Practice, and Architecture of Bridges, by Messrs. Hann and Hoskin.—Claxton's Hints to Mechanics, &c. &c. all waiting (and several of them have been for months), for the time when our overwhelming reports will give us opportunities to notice them.

RAILWAY NOTICES.

Anti-Dry-Rot.—We are happy to find that the misfortunes which have befallen this company have not at all impeded its business. Several new companies have taken to Kyanizing their timbers, and we expect the whole of them will find it necessary ere long. Some particulars of a most fraudulent conduct in the subs of some of the companies have reached us, but at present we withhold their names. It has been stated to us that certain servants of companies entrusted with the Kyanizing have used the liquid of a much inferior strength, charged their employers the full amount, and divided the savings among themselves. We advise companies to have their eye on these proceedings.

Birmingham Railway.—On the resignation of Mr. Baxter, Mr. Baxendale, a gentleman, we understand, every way equal to the discharge of such extensive duties, has been appointed to the whole out-of-door management of the traffic and other affairs belonging to the railway. It has been reported to us that the company have increased their time to Birmingham to 7 hours, that is, at the rate of only 16 miles an hour. We hope this is not the fact, or if it is that it is only for a short period. When this line was about to be opened the public was told we were to have nothing less than 25 miles an hour, and 30 were talked of. If we are now to be reduced to the (for a railway) jog-trot of 16 miles an hour, wherefore have 5½ millions of money to be spent? In 10 hours coaches have done, and can do, the distance on the present roads; and if only one-twentieth of the cost of the Birmingham company was laid out in improving them, we think it might be done in 8 hours, if not in 7, that is, the very time of this renowned line.

Birmingham and Grand Junction Railway Receipts.—We understand the weekly receipts of the Birmingham line, 112½ miles long, and with a cost of 5½ millions, have sunk to about 8,000*l.* per week, while those of the Grand Junction, only 97½ miles, and with a cost of only 1,800,000*l.*, amount to near 7,000*l.* per week. If the receipts were to be in proportion to the costs and distances, the Birmingham receipts should much exceed 24,000*l.* per week, that is, be more than three times their present amount.

Birmingham, Bristol, and Thames Junction Railway.—We understand all the contracts are taken, and the whole line, it is expected, will be completed in September next.

Bristol and Exeter Railway.—This company held their general meeting at Bristol March 5, Frederick Ricketts, Esq., in the chair. After the secretary, James Badham, Esq., had read the report, in another part of our journal, some desultory conversation arose respecting the utility of the London office. The chairman said this office had been found of great utility, but Mr. Beck thought otherwise. In moving the adoption of the report, W. Cole Cole, Esq., said he had no doubt the directors had good reasons for at present limiting their operations to opening the line only as far as Bridgewater, but he hoped, this once attained, they would proceed on to Exeter. Seventeen coaches, he observed, left that city daily, which was a sort of central point for all the western travelling, and it was, therefore, highly desirable the line should be extended there. He was glad to be informed that there would be no necessity to increase their capital. Robert Castle, Esq., would never have become a shareholder if he had thought the line would stop short of Exeter, which he was convinced would greatly increase the traffic. To enable the directors to carry out the project, it was obviously needful to pay up the calls, and he would, therefore, urge

every gentleman, as soon as the meeting was over, to go and pay up what was due. (Loud cheers.) C. B. Fripp, Esq., perfectly concurred in the necessity of extending the line to Exeter. He was satisfied it was a part that would pay well, and it would besides prevent the possibility of a competing line; but he thought it was better to leave the further completion of the line to the directors. (Hear, hear.) The chairman stated it was the object of the directors to open to Bridgewater first, and then to Taunton and Exeter. Some discussion afterwards followed respecting the registry, when the secretary said there were 1,058 shares to be forfeited out of 15,000, of which 661 had had 5*l.* each paid, and 394 had 10*l.* Mr. Fripp hoped these shares, on which 13,000*l.* had been paid, would not be distributed, but be held in reserve for the benefit of the company. They had now a sound proprietary of 14,000 shares, which was enough to carry out the undertaking. In answer to Mr. England, it was stated, that all the land between Bristol and Bridgewater had, with a few trifling portions, been bought and paid for, and that there was now on the line 12 sub-engineers, 1,500 workmen, 60 to 80 horses, and two locomotives. After the election of the directors, for which see the advertisement, and the usual votes, the meeting separated very much gratified.

Brighton Railway.—March 19th, the engine on the Shoreham branch commenced running from the Hove cutting to Southwick, a distance of 3½ miles, to the satisfaction of a large concourse of spectators. It took 27 loaded wagons for the embankments there, at the rate of 20 miles an hour. The weight of the loaded wagons exceeds 100 tons. There can now be no doubt about the completion of this portion of the railway, even in the minds of the most sceptical; and we are assured, upon the best authority, that the works on the main line are progressing equally rapidly with those here. The water has left the Clayton shafts almost entirely, and the works there are again going on with vigour. At Balcombe, also, great exertions are being made, and no doubt at all is, or ever was, entertained of the easy practicability of making the tunnels at both these places within a reasonable time.—*Brighton Herald.*

Chester and Birkenhead Railway.—The first stone of a viaduct, intended to cross the Mostyn Valley, was laid by the chief engineer, John Dixon, Esq., assisted by Mr. J. Reid and Mr. J. A. Yarrow, sub-engineer, with this exception to the usual ceremony, the coins were placed on the top of the stone instead of being deposited under it, a course of proceeding evidently gratifying to the numerous workmen assembled, who shortly converted them into liquids, in order to drink success to the undertaking. With the assistance of one stationary engine, and working by night, there is not the least shadow of doubt but that the line will be ready for opening by Chester races, 1840.—*Liverpool Journal.*

Chester and Crewe Railway.—We learn that Messrs. Jackson and Bean, who completed a portion of the Birmingham and Derby Junction Railway, have undertaken the Bunbury and Wardle contract, in length about 10 miles, on the Chester and Crewe line.—*Chester Gazette.*

Commercial Blackwall Railway.—This company held their general meeting, February 28th, in London, William Routh, Esq., in the chair. After the preamble of the Bill for the extension of the line from the Minories to Fenchurch-street had been read, a lengthy discussion took place on a motion of Alderman Thompson to oppose it. He thought the extension would be stoutly opposed, would cost 300,000*l.* to effect it, and 20,000*l.* to carry it through Parliament. The chairman assured him the cost of extension would not, he believed, exceed 100,000*l.*; and as to the expenses of opposition, as Captain Page observed, the citizens might make

long speeches, but were not very ready to put their hands in their pockets for heavy expenses. After some discussion, Alderman Thompson withdrew his motion, and the meeting broke up in great harmony. Our readers will remember that, in 1837, a Bill was introduced into Parliament, passed the Commons, and got into Committee in the Lords, to extend this line from the Minorities to the East India House in Leadenhall-street, when the session was closed by the death of the King. At that time an agreement was entered into by the city of London and the opponents of the Bill, with the directors, signed by the counsel on both sides, and confirmed by the corporation, namely,—“*That a similar Bill for extending the line of the Commercial Railway might be proceeded with in the next or following session, without any opposition upon the part of the present Petitioners up to the particular period at which the inquiry on the present Bill had terminated.*”

Will any honest man now tell us, upon what principles of good faith or honour the present clamour against the company is now raised?

Croydon Railway.—A very different meeting was held, March the 8th, John Moxon, Esq., in the chair, to the one we had before the pain to record. Mr. Cubitt, the engineer, underwent a long questioning on the subject of the line and works, and gave his testimony most strongly in favour of Mr. Gibbs the engineer's plans and execution of the work. The consequence was, a vote of thanks to himself, and of approbation to Mr. Gibbs. A vote of thanks was also passed to the Committee of Inspection. Mr. Cubitt said his estimate for the completion of the work was 5,000*l.* more than Mr. Gibbs'. This convinces us that Gibbs, it is highly probable, is right; for Cubitt's estimates are generally above, rather than under the mark. Mr. Cubitt thought the line could be opened by the end of May, or beginning of June, but he should advise no part to be opened until the whole could. See the report in another part of our journal, and the resolutions on our wrapper.

Doncaster, North Midland, and Goole Railway.—We understand that the project for connecting Goole, Thorne, and Doncaster with the North Midland, and the Sheffield and Rotherham Railways, has been received with high prospects of success. It will branch from the North Midland, and Kilnhurst, and proceed through or close to Doncaster, extending inwards to the port of Goole. The preliminary steps have already been taken, and the line is now being surveyed under the skilful direction of Mr. Swanwick.—*Derby Reporter.*

Eastern Counties' Railway.—The works have been commenced at the west end of this town, a number of labourers being employed in digging for brick-earth in the Fair-field, for which the purchase money, 10,000*l.*, has been paid into the Court of Exchequer. Great exertions are making night and day to carry on the works near Brentwood, with all possible expedition; and along the valley towards Romford, as also between Ilford and Romford. That part of the embankment that gave way on Stratford Marshes, has been repaired. A train of wagons loaded with earth on the inclined plane near Romford, lately ran over the end of the embankment, from the man not being able to fix the block in the last wheel.—*Essex Standard.*

Edinburgh and Glasgow Railway.—The works on this line are proceeding rapidly. In a few days upwards of 26 miles of the line will be under contract. It will be completed in 1841. We have before us a map and section of this line, and we must say that we could scarcely have believed it possible, in Scotland at least, to have found a line for 46 miles of length with such singularly good gradients. Want of time prevents us from more minutely looking into the prospects of this railway from the statistics on

our table; but if so favourable a line between the capital of Scotland and Glasgow, a place proverbial for its vast and rapidly increasing trade and population, will not be a good thing, where are we to look for one?

Glasgow and Ayrshire Railway.—The various works on this line are proceeding apace. The erections at the terminus here are being carried on with much spirit, the elevation, which is to the river, is light and handsome. Upwards of 1,000 tons of malleable iron rails have been landed at Ayr and Troon, and the contractors have commenced laying them between Ayr and Irvine. Along the line the scene is altogether animating.—*Ayr Advertiser.*

Glasgow and Carlisle Railway.—A numerous meeting of merchants bankers, &c., was held at Glasgow, March 8th, for the purpose of adopting measures to establish a railway communication by Carlisle with Liverpool, Manchester, and London. It appeared to be the general opinion that a line through Nithsdale, was preferable to any other. By that line it would require only 10 hours to travel from Glasgow to Liverpool or Manchester, a rate of speed which never could be attained by steam navigation. Resolutions in accordance with the objects of the meeting were agreed to, and subscriptions made for defraying the expenses of the survey.—*Sun.*

Great North of England Railway.—House of Commons.—Mr. Pease, after moving for leave to bring in a Bill for the extension of time to complete works, Mr. H. Lambton complained of the conduct of the directors, in not proceeding with that portion of their line between Tees and Tyne. Mr. Pease in answer said, the directors were anxious to proceed with the entire line, as soon as their finances would permit. In regard to the portion between Tees and Tyne, the company had laid out to the amount of 60,000*l.* already in the purchase of land, and had incurred a debt besides to the amount of nearly 100,000*l.*, and they were desirous to proceed with the work necessary to connect the line from London towards Edinburgh as fast as possible. The Bill was then brought up.—See a very gratifying report of this company on our wrapper.

Great Leinster and Munster Railway.—The half-yearly general meeting of this company was held March 2d, and adjourned, as stated on our wrapper, to April 29th, that is, until after the 22d, when Lord Morpeth's resolution on the Irish railways is to be brought up. Instead of giving the report of the company, which had nothing material to detail, we have given copious extracts from the engineer's report. Some gentlemen suggested that they should apply to Government for compensation in case the commissioner's system was adopted. Mr. G. Lewis Smyth thought such application would be little attended to, and in a very able speech displayed the impolicy, both as regards England and Ireland, of the Government's interference in railways, and said, in which we perfectly agree, that it was not only Parliament, but the people of England, whose money was about to be spent, who should resist the iniquitous measure.

Greenwich Railway.—The general meeting was held March 14th; Wm. Shadbolt, Esq., in the chair. This was a rather stormy meeting. A Mr. Andrews made himself very conspicuous by a long alphabet of questions he had prepared, to the evident annoyance of the meeting. It appeared that the London Joint Stock Bank had advanced 65,000*l.* at 5 per cent. interest, and 500*l.* per annum for management. The last board had stated that 75,000*l.* would be required to complete the works, but the present board had found 65,000*l.* sufficient. Mr. Andrews complained of the contract for the carriages, but Mr. Wilson showed that what had cost the company near 19,000*l.* for 3 years, would be done for about a net 2,600*l.* per annum. Several minor matters were discussed, but uninteresting to our readers. We have seen a paper

making some large claims on the company by Mr. Walter, the late managing-director of the company, and we believe a law-suit is now pending about them. This is exceedingly unfortunate, and tends very much to injure the property of the concern in public estimation. Why is not this matter brought to an amicable issue? We really think it would be to the honour of the company, and we are quite sure it would be for the advantage of the shareholders to have these unfortunate proceedings put a stop to. A committee of two or three of the board, we are satisfied, might easily settle it. We hope the hint will be taken by both parties, and we have no doubt the result will be for the benefit of both.

Harwich Railway.—It has been determined by the provisional committee, wisely, we think, not to proceed to Parliament for an Act for this railway in the present session, but to rest quietly on their oars till it is necessary to commence operations for the next session, by which time a portion of the Eastern Counties line will be opened, and the works of the remaining part to Colchester further advanced towards completion.

The importance of this line becomes more manifest every day, and we are glad to learn that the Government intend to make Harwich a harbour of refuge, and to make their arrangements for this purpose in such manner as to afford every facility to the Railway Company for carrying into effect their plans.

Irish Railways.—If our information be right, the Government job will either not be persisted in, or will be defeated if it be brought forward. We should hope Ministers will see the propriety of withdrawing it. Our observations in the last number have exposed us to animadversions from several of the papers to whose good opinions on former occasions we have been indebted. This we may lament, but we must discharge our public duty in the way we conscientiously believe to be right. One of our critics, the "Sun," observes, that "we know no more of the internal state of Ireland than we do of the geography of the moon." We thank him for the compliment, and beg to return it in the expression of our belief that he must be under the influence of the moon, or he would not advocate such a monstrous system and flagrant job.

We have no political feelings at all on the subject, and certainly have none personal against Mr. O'Connell. The fact is, we are convinced of the evils of Government interference in these works, and more especially that the commissioners' system (see extracts from Macneil's report, one of the commissioners' engineers), on which it is proposed to spend the money is a bad one, and will be injurious to the country. If Ireland is to be permanently benefited, we do not think Government's executing, instead of encouraging railways, is the right way. As an Irish gentleman writes to us, "The chief cause of Irish poverty proceeds from individual bad management and from nearly a total absence of industrious habits. Whilst the people are dead to their own interests and resources, Government capital can only partially assist them during the time it is expending. Until a reaction takes place in the views of the people different to their present political and private bias, little real good can be done for Ireland."

We have just learnt that this job is again to be brought forward on the 22d of April. We trust all those who mean well to both countries will unite to oppose it. If they do not, we pledge ourselves they will bitterly repent it.

We understand there is but little doubt but that this job will fail, but we believe there is something meditated against the English railroads. What

is reasonable and proper we know the companies will willingly submit to, but what is not we hope they will firmly resist. They have the strength, let it not be said they want the will to defend their own interests.

Lancaster and Preston Railway.—The operations on this line are in very active progress. We are glad to learn, that so far as the works have proceeded, the engineering arrangements have been conducted under the most favourable circumstances, and that no impediment or obstruction has been encountered.—*Wigan Gazette.*

Leeds and Bradford Railway.—The report of Messrs. Stephenson and Gooch has been presented to the provisional committee. The estimated cost of laying down the railway is 400,000*l.*, exclusive of stations, depots, engines, which, together with all other necessary machinery, will require a further sum of 50,000*l.* An important feature in the report is the formation of a junction line between the main line and the North Midland, which is intended to cross the turnpike-road near Wellington Bridge, and passing between Messrs. Marshall and Co.'s works and the village of Holbeck, and between Mr. Russell's pottery and the toll-bar, and thence to the North Midland Railway, a little south of the Leeds pottery. This junction line, about one mile and three-quarters in length, will enable passengers, &c., to pass on to the latter railway without the inconvenience and expense of changing conveyance.—*Bradford Observer.*

Manchester and Birmingham Extension Railway.—After an unprecedented contest in the standing orders' committee of 24 days, and a consideration of, we understand, of about 394 objections, the examination closed, March 26th. We understand 54 allegations, with special circumstances, are to be sent for consideration to the select committee at the meeting of the House on the 12th of April. These special circumstances are understood to soften the allegations. It is said, that 200 witnesses have been had up in this affair. About 120,000*l.*, it would seem, had already been spent to procure a Bill. In an enlightened country like England, is it not disgraceful that the money of private individuals, seeking to establish an object of public utility, should be so shamefully wasted by, we may say, the Legislature itself? Three honest men, understanding the subject, would have settled the questions of this line in three days, and much better than our Legislature would in 300.

We have not, we believe, taken any part in this discussion, simply because we are not fond of fishing in troubled waters; nevertheless we have an opinion, and a very strong one, on the subject. Several highly respectable meetings have been held at different places, and very strong and indignant resolutions have been passed against the conduct of the parties opposing them. The Manchester papers are very severe on it. Certainly if ever indomitable perseverance and resolution deserved success, all must admit the promoters of this measure certainly do richly merit it.

[A meeting of the merchants, manufacturers, and other inhabitants of Stockport, was held in that borough on Monday, for the purpose of taking into consideration the propriety of petitioning Parliament in favour of the Manchester and Birmingham Extension Railway Bill. Ralph Pendlebury, Esq., Mayor, was called to the chair. The meeting was addressed by Messrs. Oxon, James Bradshaw, Vaughan, P. E. Marsland, Alderman Baker, Jonathan Robinson, Alderman Boothroyd, Henry Coppock (town clerk), Mr. Rostron, and Mr. Clay, by whom resolutions were moved and seconded, and unanimously adopted by the meeting, their substance being embodied in a petition, also unanimously adopted by the meeting. A meeting for the same purpose was also held at Congleton on Monday last. *Midland Counties' Herald.*]

Midland Counties Railway.—The works on this line are progressing with great spirit. The line between Nottingham and Derby is proceeding rapidly, and will, we understand, be opened on the 1st of next May. At the tunnel near Red-hill, a double number of hands have been employed; a passage through the hill has been effected. The greater part of the tunnel is already arched, and three piers of the bridge across the Trent are erected, and the coffer-dam for the other pier is nearly finished. The embankments and excavations are in a state of forwardness. The part of the railway from the Trent to Leicester will be opened early in the spring of next year, and the remaining part from Leicester to Rugby, in the course of the following summer.—*Sheffield Patriot*.

Manchester and Birmingham Railway.—A large and highly respectable portion of the proprietors met at the general meeting, of which we have given the directors' report in another part of our journal. A lengthened discussion arose on the opposition and prospects of the extension line. Great sums of money have been already spent in contests, and it seemed to be the feeling of several gentlemen present (particularly of J. P. West-head, Esq., a director), that if the extension line did not succeed this session, that they should join the Grand Junction at Crewe. At least, it was settled that nothing further should be done without obtaining from the proprietors explicit authority. Very severe animadversions were passed on the Grand Junction and Birmingham companies for their opposition and conduct, and the libels that have been published on the highly respectable directors of the line. The Eastern Counties' ex-secretary's paper had its meed of contempt poured on it for the disgraceful turn-coat prostitution it has displayed. What other conduct can gentlemen expect from such parties?

[Compensation Cases] :—A Sheriff's Court was held at the York Hotel, Manchester, on the 7th of March, to assess the value of land near the terminus, and damages near Union-street, Ardwick. Mr. William Haley claimed from 4,000*l.* to 5,000*l.* for land near Union-street, Ardwick, and some cottage houses thereon; the jury's verdict was for land and buildings, 3,002*l.* 10*s.*; damages, 200*l.*; total, 3,202*l.* 10*s.*; the company offered 3,100*l.* 8*s.*—Mr. John Greenhalgh claimed for 1,353 square yards of land 3,000*l.*; the company offered 1,300*l.*; the jury assessed the value of the land and shed at 917*l.*; damages, 300*l.*; total, 1,217*l.*, or 83*l.* less than the company offered. Messrs. Jones and Carver accepted 5*l.*, the company's offer for loss in removing. Captain Taylor, in respect of some buildings in London-road, consented to take a verdict for 4,860*l.* Mr. William Deakin claimed 4,855*l.* 12*s.* 4*d.* for a number of houses; the nett rental was 216*l.* 18*s.*; the jury's verdict was 3,839*l.* 10*s.*; the company offered 3,800*l.*

Manchester and Sheffield Railway.—[Compensation Cases] :—On the 12th of March a Sheriff's Court was held at the Manor Court-room, Manchester, to assess the value of property on the above line, situated in or near the township of Openshaw, about 4 miles from Manchester. George C. Legh, Esq., claimed for 51,300 square yards of land and for severance, from 8,000*l.* to 10,000*l.*; the jury assessed the value of land at 2,205*l.*, and damages at 700*l.*; total, 2,905*l.* The trustees of the Audenshaw School took a verdict for land by consent, 650*l.*; damage, 5*l.* Mr. Brooks claimed sums from 1,400*l.* to 1,820*l.*, as per valuation, for 7,000 square yards of land, part of a plot of 20,000 square yards; the jury gave a verdict for the land, 299*l.* 18*s.* 4*d.*, and for damage, 150*l.*; total, 449*l.* 18*s.* 4*d.* Mr. Brocklehurst claimed 3,500*l.* for 2*a.* 0*r.* 20*p.* of land, settled by consent, for the land, 2,000*l.*; damages, 500*l.*; total, 2,500*l.* The assignees of Aaron Lees claimed for 3*a.* 26*p.* of land; the jury assessed the land at

184l.; the trees at 10l.: total, 194l. Mr. H. W. Burgess claimed 12,000l. for land situated at the junction of the Manchester and Birmingham Railway; verdict, by consent, for land, 7,000l.; for damages, 800l.; total, 7,800l.; the company offered 6,100l. Misses Ainsworth claimed for 3s. 8r. of land; the jury gave a verdict for the land, 168l.; trees, 10l.; damage, 15l.; total, 193l.—*Manchester Courier*.

Manchester and Leeds Railway.—A correspondent informs us, that "The extensive viaduct on the Rochdale contract, executed by the experienced contractors, Messrs. Thomson and Turner, is now completed and ready for the rails. It consists of 15 stone arches, 21 feet span, together with 4 large iron arches over the Rochdale canal and Oldham road. There are 7 other stone bridges on the contract completed, and the whole of the embankments finished, and the permanent road laid. The whole contract will be finished by the 1st of April, and it has only been in operation 14 months."—*Midland Counties' Herald*.

Northern and Eastern Railway.—The adjourned half-yearly general meeting, held March 19th, at the London Tavern, City; Henry George Ward, Esq., M.P., in the chair. "The proceedings having been opened in the usual way, the CHAIRMAN said he would not trouble the proprietors with many prefatory observations before reading the report of the directors, which entered at very considerable length into all the material points upon which it was necessary that the proprietors should this day give their decision. The directors had never before had so important a statement to submit as that which was now to be laid before the meeting, and he (the Chairman) would only express a hope, particularly after what had occurred at the meeting last week, that any remarks which the proprietors might have to offer would be made in a spirit of moderation, and with a regard to their own interests, and the interests of the company. (Hear, hear.) The proprietors were aware how large a stake the directors had in the undertaking, and they must feel that the more their observations were confined to the immediate business of the meeting, and the more they were divested of personal reflections, the more conducive they would be to the best interests of the company. (Hear, hear.) There was one most important point connected with the business of the present meeting, upon which he would briefly remark. The directors had expected that yesterday the decision of the Standing Orders' Committee, relative to proceeding this year with the junction line, would have been known, but being the last of five cases, the others were only just disposed of when the Speaker of the House took the chair. It would, however, be the first to come on to-morrow, and then they would be able to ascertain whether the formal regulations of the Legislature could be departed from under the peculiar circumstances of the case. He would state publicly, that this application differed most materially from all similar applications hitherto made to Parliament. The company were without the slightest opposition from the owners, leasees, or occupiers of property on the junction line; in fact, they had entered into contracts for the purchase of the land, and had taken every precaution to entitle them to success. Should their application be refused, it must be taken for granted that this would be a precedent, and that in no instance could a similar application be entertained, so as to dispense with the formal orders of the House. (Hear, hear.) He had spoken on the subject to several members of the House, who were best acquainted with these regulations, and who had assisted in drawing them up, and he was very sanguine of success, although it was well known that during the present session the standing orders had been very rigidly enforced, and that many Bills had, from non-compliance with these regulations been thrown out. Such Bills, it was true, differed very

materially from that sought to be introduced by this company, and it was for this reason that the directors had done everything in their power to deserve success—even if they should not command it. (Hear, hear.) With the permission of the meeting he would now read the report of the directors.

“The Honourable Gentleman accordingly read the report (on our wrapper), which was very favourably received.

“The CHAIRMAN expressed his readiness to answer any questions that might be put.—Mr. THOMSON wished to know whether compensation to the landholders in the portion of the original line between Tottenham Mills and Islington, now abandoned, was included in the 480,000*l.* referred to in the report as sufficient to complete the line to Bishop Stortford.—The CHAIRMAN said it was not included in any way, except that a very large margin (to the amount of about 32,000*l.*) was set apart for contingencies, and among others, to any claim that might be made for compensation on this part of the line. In order, however, to show the impossibility of giving any definite information on this subject, he would just state that a negotiation had been opened in respect to a large property which they were compelled to take on the part of the line which it was now proposed to abandon, and that there was a possibility, not to say a probability, that this property could be transferred to a third party without loss to the company. (Hear, hear.) The company would, of course, in their Bill now before Parliament, apply for the necessary powers to complete this and similar transfers.—Mr. THOMSON thought the explanation which had been given very satisfactory. (Hear, hear.)—The CHAIRMAN said, it was now for the proprietors to consider the plan which had been submitted to them by the directors in their report, so that the Bill embodying that plan might be at once proceeded with. If the proprietors thought it proper to abandon a portion of the line, of course they would not keep the power of purchasing property in a compulsory manner hanging over the holders on that part which it was thought better to give up. It was, therefore, for the proprietors to consider their decision on the plan now submitted to them. It was to be looked upon as one whole, and could not with propriety be separated into different parts. (Hear, hear.)—Mr. WILLIAMS thought that the report did much credit to the chairman and directors, for it showed that they had anxiously and carefully watched over the company's interests. (Hear, hear.) It did appear to him (Mr. Williams) that to abandon the portion of the line, from Bishop Stortford to Cambridge, would not only be much more advantageous to the company, but would greatly quicken their operations. A line of so much importance as the northern and eastern, especially when looked upon as proceeding beyond Cambridge, must be taken up by the public sooner or later, and once placed upon a sound and wholesome basis, must infallibly command the attention of the railway world. He had, therefore, much pleasure in moving that the report of the directors be received and adopted.—Mr. SHEWELL would cordially second the motion. He thought the proposal for stopping at Bishop Stortford a most excellent one, even if they had the whole of their capital subscribed. (Hear, hear.)—The CHAIRMAN said, they had not gone into details in the report, but those acquainted with the locality knew that the part of the line from the junction with the Eastern Counties' Railway to Bishop Stortford was the best out of London with regard to levels, as was proved by the small cost for which it had been constructed, as laid before the proprietors on a previous occasion. But the moment they passed Bishop Stortford they entered into a very different country. There was first a long embankment, and the purchase of the property would be very expensive, and this was the reason why the per centage of revenue

was so much larger to Bishop Stortford than upon the whole line, rendering it, as Mr. Shewell had very justly observed, a much more profitable investment to stop at Bishop Stortford, even if they had the whole of the capital subscribed for. (Hear, hear.) They might, it was true, have had Cambridge as a terminus, the value of which he (the chairman) had no wish to underrate, but as prudent men, the directors thought it better to limit their expenditure to their means, and at present to proceed no further than the place referred to. (Hear, hear.) A PROPRIETOR inquired, whether the power of raising money by loan would be embraced in the Bill now before Parliament.—The CHAIRMAN said, this could not be done, because certain notices required by the standing orders of the House had not been given. They could, however, apply for this power next year, and at present the want of it could not affect the proprietors, as no money could be raised by loan until half the share-capital had been paid up.—Mr. SHEWELL inquired whether it would not be possible to reduce the shares to half their value, by making them 50*l.* shares instead of 100*l.*—The SOLICITOR said, it might be tried, but as certain notices relative to the abandonment of a portion of the line were necessary, it was probable that the Standing Orders Committee would not entertain the application.—Mr. WILLIAMS thought it would be as well not to risk any such application during the present session.—The CHAIRMAN said, of course they would risk nothing respecting the success of which there could be any doubt.—A PROPRIETOR wished to know whether the liabilities of the company for the portion of the line beyond Bishop Stortford would now cease.—The CHAIRMAN said, that as no notice of taking property beyond Bishop's Stortford had been given, there could of course be no legal liability. The powers of the company for the compulsory purchase of property, expired next summer, and it was the wish of the directors that they should be suffered so to expire.—After some further conversation, the CHAIRMAN said, he should be glad to answer any further questions that might be put.—No one having availed himself of the opportunity, the resolution was put, and carried unanimously.—The CHAIRMAN said, it was exceedingly gratifying to the directors to find that their proposals had met with the unanimous approbation of the proprietors. He would only express a hope, that the proprietors would feel the necessity of supporting the directors in carrying out the undertaking. They must expect to be called upon for money at regular intervals. The proprietors had already suffered by the delay which had occurred from the state of the share-list, but it was now brought into a more perfect state, and nothing but the apathy of the shareholders could now prevent the rapid prosecution of the works. (Hear, hear.) He could not close these brief observations without adverting to the great services performed by their surveyor, Mr. Leifchild, upon whom the whole business of surveying the junction line had devolved, and who had completed it within the time and the estimates originally proposed. He thought they ought not to let the occasion pass without a public acknowledgment of their obligations to that gentleman. (Hear, hear.)—Mr. WEDGEWOOD then proposed, and Mr. THOMAS seconded, a vote of thanks to the chairman and the directors, for their unwearied efforts in the company's behalf. The motion was carried by acclamation.—The CHAIRMAN, in returning thanks, expressed a hope that the harmony which had marked the proceedings of the day, would be extended to the future operations of the company.—The meeting then broke up.—[This account of the proceedings has been furnished to us by a correspondent.—*Ed. "Railway Magazine."*]

North Midland Railway.—We are glad to learn that the three companies, the North Midland, the Birmingham and Derby Junction, and the

Midland Counties, have agreed on the plans and details of their adjoining stations to be erected at Derby. Owing to the important interests involved, the settlement of these matters has required great consideration.

[*Aldred v. Question of lowering a Road*].—Vice-Chancellor's Court, March 20th.—This was an application on the part of the trustees of the turnpike-road, to restrain the company from making a bridge they were about, over the turnpike-road leading from Rotherham to Swinton. It appears that the trustees had been assenting parties to the Bill, "provided the railway should cross over the road at a sufficient elevation, and the road be not lowered to effect such elevation, or otherwise prejudiced thereby;" and the ground of the present application was, that the company were attempting to evade one of the conditions. By their Act, every such bridge arch was to have a clear span of 25 feet, with a height of 16 feet, and the descent must not exceed 1 in 30. To effect this, the company had built the bridge 14 feet 8 inches, and lowered the road 16 inches. The country being low and swampy, and subject to floodings from the river Dun, this was objected to. The counsel for the company were not called on to address the court. The Vice-Chancellor said, he was of opinion the assent the trustees gave before the passing of the Bill did not in any way prevent their opposing it in Parliament to obtain the modification they insisted on as a protection to the road. The Legislature had, however, with a full knowledge of all the assents and dissents to the Bill, suffered it to pass without any restriction of the ordinary powers given to railway companies, and therefore the court could only give effect to what they had thought right to enact. He admitted the company would have been bound by any previous agreement that might have been entered into with the trustees and agents of the petitioners for the Bill, but that circumstance did not exist in the present case. Though there was a particular proviso in the Act which prevented the company obstructing rivers or waters to the prejudice of mills, there was no proviso which limited their power of levelling roads, and it seemed the Legislature had entirely overlooked the necessity of imposing any terms on the company in this respect. All that could be said amounted to this, that the company might do a damage to the road, and the court had not any power to prevent it. The motion, however, must be refused with costs.

[On the night of the 2d March, in consequence of the railway having to be carried under the bed of the Cromford Canal, at Bulbridge, an iron tank, 150 feet long, 9 feet wide, and 6 feet deep, was made for the purpose of preventing the water escaping from the canal. The tank having been previously conveyed in five different parts near to the place it was intended to be fixed, was riveted together about midnight, and floated to the spot, and there sunk and embedded. The whole of the proceedings were finished in twenty-four hours, without having interrupted the traffic on the canal.—*Derby Reporter*.]

Newcastle-upon-Tyne and Carlisle Railway.—The annual meeting of the proprietors in this undertaking was held on Tuesday, the 19th March, at the Assembly-rooms, in Newcastle-upon-Tyne, at which a very numerous and highly-respectable body of the shareholders attended; Matthew Plummer, Esq., in the chair. The chairman opened the meeting by stating that the directors had a short time ago communicated to the shareholders (by circulars from the Secretary) their opinion of the prosperous state of the affairs of the company, on which he had great pleasure to congratulate the meeting, and although their prospects have occasionally had a passing cloud over them, yet, by the exertions of the directors, supported by the confidence of the shareholders, they have been able to surmount many

difficulties which lay in their path, and he could assure the meeting, that it was highly gratifying to the directors to meet the shareholders on this their annual meeting under such favourable circumstances, for no one can now entertain the least doubt of the very great value of the undertaking, and that the shareholders will be amply rewarded for their patience and perseverance. The report, for which see another part of our journal, was then read, which produced from the meeting decided marks of approbation. It was then moved by Geo. Saul, Esq., and seconded by Thomas Wilson, Esq., "That the report of the directors now read be received and adopted, and that it, together with the managing committee's report, and the accounts showing the receipts and payments of the company to the 31st December, 1838, for the formation of the railway, stations, houses, engines, wagons, &c., and the revenue account for last year, ending at the same period, be printed, and a copy sent to each shareholder, which was agreed to." After a great deal of discussion on various subjects connected with the business of the day, the chairman called the attention of the meeting to the paying off of the debentures given to the shareholders for interest, and making a dividend. It was moved by Mr. Hudson, and seconded by Col. Coulson, "That the recommendation of the directors on this subject be adopted, and that the directors be authorized to provide for the payment of the debentures given to shareholders for interest, and for interest due thereon, and that payment be made for the same in cash, or by other debentures, bearing interest at five per cent. per annum, at the option of the holders; but that no new debentures be issued for a less sum than 100*l.*, and that such exchange, or payment, be made on or before the 28th May next; and that the directors be also authorized to pay the dividend of 4*l.* per share to the shareholders, on the 18th July next," which was agreed to. The directors who went out by rotation were re-elected, and Mr. Ramshaw was nominated again as a director by the Earl of Carlisle. The thanks of the meeting were voted to the chairman, when that gentleman expressed his acknowledgments, and the meeting separated.

Preston and Longridge Railway.—We understand that Mr. Wilkie, the principal contractor upon this line, has completed his works; the permanent rails are now laying, so that, in all probability, the railway may be opened in the summer. It is calculated that a saving of 2*d.* per cubic foot upon the carriage of ashler-stone, and 18*s.* 6*d.* per ton upon walling-stones, from Longridge to Preston, will be effected by this means.—*Preston Chronicle.*

Penrith and Carlisle Railway.—We are glad to hear that Mr. Larmer has not only very much improved, but shortened the line, which is now not more than 17 miles in length from the terminus at Penrith Castle to the junction with the Newcastle and Carlisle Railway, at St. Nicholas, near this city. The share list has lately been very considerably increased, so much so, that the committee fully anticipate the completion of the line within two years after the Act is obtained.

York and North Midland Railway.—The works on this line advance rapidly, the men still continue to be employed day and night, and the excavation of the rampart is now completed. The foundations of the walls for the company's depots, near to the river, have been laid, and the bricklayers are busied in the building of those walls.—*Doncaster Chronicle.*

Reynolds's Trough Rails for Railways.—We have seen a circular letter from Mr. Reynolds, to the directors of the unfinished railways, giving the reports of Messrs. Robert Stephenson and J. K. Brunel, on the specimens of his plan of railway laid on the London and Birmingham and Great Western lines, together with other particulars, which appear to afford strong grounds for anticipating that Mr. R.'s plan will prove to be both efficient and economical in practice.

Railway Society.—The nucleus of a society under the above title has been formed, to be "composed of proprietors of railway shares, and persons otherwise connected with, or interested in railways, for the purpose of promoting the scientific improvement and protecting the interests of those undertakings." A preliminary committee for the purpose of carrying out the above view has been formed, "consisting of Mr. Glyn, the chairman of the London and Birmingham and North Midland Railway Companies; Mr. Sims, the chairman of the Great Western Railway Company; Mr. Russell, director of the same company; Mr. Bosanquet, the chairman of the Eastern Counties Railway Company; Mr. Tyndale, the chairman of the South-Eastern Railway Company; Mr. H. Smith, the chairman of the Birmingham and Derby Railway Company; and Mr. Dicey, the chairman of the Midland Counties Railway Company, who have power to add to their number." "The original subscribers are to be admitted on payment of an entrance fee of five guineas, and an annual subscription of two guineas, which will entitle them at all times to have access to the rooms of the society, and the library, maps, models, and other objects of interest which may be collected." We need not observe, that we think some society to protect the vast interests of railway companies, in which so many millions of money are embarked is needful. As far as our humble abilities and means have gone, we have endeavoured to do this ourselves; but we shall be very glad to see it taken up by more able hands. The names of the gentlemen forming the above committee are well known, and highly respectable. We can only say, that any association for so great and useful an object, based on sound liberal principles, will have our cordial co-operation and support.

South-Eastern and Brighton Railways.—It is with sincere pleasure we hear that these companies have settled the differences which so long have divided their interests. Our readers are aware, by our history and description of the South-Eastern line in No. 34, that, by the Brighton Act, the South-Eastern Company had the power of purchasing, at cost price, twelve miles of the London end of the Brighton line; that is, from the junction of the South-Eastern and Brighton lines up to Croydon. In the event of this, the Brighton would have become a tributary branch and stream to the South-Eastern, and have been obliged to pay tolls as such. Placed in these peculiar positions, it was the interest of the South-Eastern Company to forward as much as possible the success of the Brighton, because they were thus aiding themselves; on the contrary, it was imagined to be the interest of the Brighton, if possible, to destroy the South-Eastern, because they would then secure the whole line from Brighton to the Croydon junction. Hence have arisen no pleasant feelings between the two. Happily the good sense of the directors has enabled them to settle their differences on a fair and equitable footing, which will consolidate the interests of both into one, and, of course, be mutually beneficial to those two great lines. The South-Eastern Company are to purchase only one-half the disputed ground, namely, that next to their own, and the Brighton Company to retain the other; each company paying to the other a toll proportional to their traffic. Should the companies also hereafter deem it advisable to have a new line and terminus into London, it is to be, in the strict sense of the term, a copartnership affair. We understand the Sea-wall, near to the Shakespear-cliff, at Dover, has been contracted for at from 4,000*l.* to 5,000*l.* under the estimate.

South-Eastern Railway.—A special general meeting was held, March 5th, for the purposes which are stated in the advertisement on our wrapper; T. W. Tyndale, Esq., in the chair. During this meeting, a discussion arose on the unfortunate hostility subsisting on the part of the Brighton Company. It was the general wish that the companies should come to the friendly un-

derstanding mentioned above, which is so obviously advantageous to all parties.

Southampton Railway.—The half-yearly meeting of this company was held, February 27th, at the company's offices, Nine Elms; John Easthope, Esq., M.P., in the chair. In answer to questions put to the chairman, he replied, that the line to Basingstoke will be opened by the middle or latter end of July, and it is expected the Southampton end about the same time. He said the line advertised from Horsham to Horley was given up, for the present year; that no opposition to that time had been offered to their branch to Gosport; that he, as an individual, should be very happy, after they had finished the present line, to aid in carrying out a branch to Gosport, and hoped it would be done. It might be opened, he observed, in twelve months after the Act was obtained. In regard to the impolicy of the intention of Government to tax the railways higher, the chairman made some very judicious observations. He showed that, before these undertakings pay any thing to the shareholders, they pay a charge of 12½ per cent. to the State. A resolution was afterwards passed, to take up on loan 110,000*l.*, the remainder of the 460,000*l.* they were authorized to take up by their Act. The three retiring directors were then re-elected, and the meeting broke up with a vote of thanks to the chairman and directors, carried by acclamation.

Sheffield, Ashton-under-Lyne, and Manchester Railway.—On Wednesday, the shareholders in this undertaking assembled in their half-yearly meeting, at the Albion Hotel. About fifty gentlemen were present; the chair was filled by Lord Wharncliffe, the chairman of the board of directors. In pursuance of a provision of the Act, the chairman first affixed the seal of the company to the register of shareholders, and then called on the secretary to read the clause under which the meeting was held.—CHARLES THOMSON, Esq., the secretary, read the clause, also the advertisement by which the meeting had been convened.—The Noble CHAIRMAN said, the next proceeding would be to read the report of the board of directors, which would be done by the secretary; but, in the first place, he would address to them a few words on the state and prospects of the railway, and the course which the directors had thought it right to pursue. He could venture to say, that from the first beginning of their direction, indeed, before the Act of Parliament was obtained, the object of all those persons who had promoted this railway, the object of the direction, had been to show to the shareholders the most perfect courtesy, to conceal nothing, and to take care that they did not engage in an expensive and arduous undertaking unless they saw their way pretty clearly to a successful termination. These principles they had kept constantly in view. This line of railway, important as were the objects to be obtained, would have to encounter one very great difficulty; and until they could see their way clearly to the completion of that work, the overcoming of that difficulty, they had avoided, as much as possible, calling on the shareholders for a greater proportion of their subscriptions than was absolutely necessary. He trusted their abstinence in that respect would, when it became necessary to call on them, cause them to receive the call more favourably than otherwise. The report to be read would contain a history of the state of the railway. They were aware that, undoubtedly, very little progress had been made in the works, the attention of the directors having been chiefly directed to the summit where the tunnel was to pass. They had ordered shafts to be sunk, and had contracted for that part of the work which led up to the western end of the tunnel. So far as they had gone, both the borings and everything else, as well as the further

examination which the engineer had been able to make respecting the laying of the strata, and so forth, had been very satisfactory indeed. Though this had been considered, by many who were not acquainted with the nature of the operations in a mining county, a work of extraordinary difficulty, they knew that persons on the Yorkshire side, and he apprehended on that side also, who were accustomed to mining operations, did not see that difficulty which presented itself to the view of others. He confessed, for his own part, he doubted whether the difficulty was in any degree greater than on other railways; but the fact of its passing so far under ground did appear startling. This was the only work of any difficulty whatever; when that was overcome, which was no difficulty in point of fact, though undoubtedly it would be a source of considerable expense, there could be little doubt that this railway, affording a communication between two towns that had been so long wished for, and which was at present in so discreditable a state, that it put Sheffield and Manchester at a distance of sixty or seventy miles in point of time, while the actual distance was only between thirty and forty—he was certain that, when once completed, this railway would at once command all the intercourse between Sheffield and Manchester, and also all that between each of those places and the intermediate towns, without any possible competition. These were the views which he took, and had taken from the first, of this railway. They had only to pursue the same course hitherto pursued,—that of caution, and avoiding as much as possible to call on the subscribers for the payment on their shares until it was actually necessary, in order to pay for works done or land bought—to carry out the undertaking to the advantage of the shareholders generally. They would hear by the report, that the greater part of the land on the western side had been already purchased or agreed for. The purchases on the other side were not so important; at the same time, measures had been taken which would enable them, if necessary, to complete the purchases by the month of May. He was happy to tell them that the purchases at this end of the line had been made at a rate which made him very sanguine that the whole of the land occupied by the line would be bought at a less rate than on any other railway. They would be glad to hear from the engineer's report, that after still further examination, and a careful revision of all the plans and estimates, he appeared to be quite confident that the expense of this railway would be brought within the capital subscribed for it. This was a very satisfactory statement, and one in which he had great confidence. (Applause.) Since last February, Messrs. Hadfield and Grave, who were solicitors for this undertaking, had dissolved partnership, on account of Mr. Grave's illness; and Mr. Hadfield being unable to carry on the business without assistance, had resigned the situation. The directors had since elected Messrs. Bagshaw and Stephenson to the situation.—Mr. THOMSON then read the report of the directors, which appears on our wrapper.—Mr. VIGNOLES, the engineer, next read his report, on our wrapper; and Mr. THOMSON read the treasurer's statement of accounts, which showed a balance in hand, including the money paid on account of the call, of 2½ per cent., in January, of 17,904*l.* 1*s.* 3*d.*—SAMUEL SEED, Esq., moved, that the reports should be received and adopted.—J. THOMPSON, Esq., of Sheffield, seconded the motion.—In answer to the Rev. R. BASSNETT, it was stated that this motion was understood to imply that they should be printed.—The motion was unanimously agreed to.—It was also resolved, on the motion of DAVID WADDINGTON, Esq., seconded by the Rev. R. BASSNETT, that the accounts produced should be passed.—The Noble CHAIRMAN stated that, in pursuance of a provision of the Act, a ballot had taken place for the omission of four

directors from the board of next year, and the following gentlemen had retired:—Thomas Ellison, George Sidebottom, Joel Sidebottom, and Charles Appleby; and it was necessary that their places should now be filled up. He thought it right, as chairman of the board, to state that the board was very well satisfied with their services, and were anxious to retain them. With respect to Mr. Appleby, he believed he had only been just elected, in consequence of a vacancy having occurred, and was immediately balloted out again. There were different meanings attached to the word ballot, and the proceedings of some boards had varied. When he saw the word in an Act of Parliament, it was best explained by proceedings of that kind in the House, such as were directed by the Grenville Act, for striking committees. The names of every Member of the House were written on separate slips of paper, folded up and put in a glass, which was sealed in the presence of the Speaker. When the ballot took place, the seal was broken, the Speaker darted his hand in, took out one of the papers, opened it, and read the name, which was then put down as one of the committee. He was not present, but he understood the ballot for retiring directors had been conducted precisely in that way, which appeared to him the real true mode of proceeding.—JOAN TURNER, Esq., of Godley, had very great pleasure in proposing that the four retiring directors should be re-elected.—JOHN CHAPMAN, Esq., of Mottram, seconded the motion.—The Rev. R. BASSNETT moved, that David Waddington, Esq., who resided within 200 yards of the railway, and who, being out of business, could devote his whole time to it if he thought fit, and who was, in all respects, an eligible man, should be one of the new directors. It was very desirable to have some one at this end of the line.—J. W. BRIDGE, Esq., seconded the motion. It was very important that they should have some directors at this end.—S. SEED, Esq., said, Manchester ought to have two, at least, out of the eight: at present, there was only one who lived in Manchester. All would agree that the town was of that importance that it ought to have at least two. He had nothing to complain of on the part of the directors, but Manchester ought to be represented.—The CHAIRMAN inquired what was the mode of proceeding when there was any difference of opinion as to the election of directors?—Mr. STEPHENSON, one of the law clerks, read the clause of the Act relating to the election.—The CHAIRMAN said there was nothing in it as to the form of proceeding. He conceived the best plan would be for all the names proposed to be written down in separate columns, and for the shareholders to make marks, according to their number of votes, opposite the four gentlemen they wished to be chosen.—Mr. STEPHENSON read the clause regulating the number of votes to be given by each shareholder. It appeared that each share, up to twenty, confers a vote; and every five shares above twenty an additional vote.—After some discussion as to the mode of taking the votes, it was agreed to adopt the plan recommended by his Lordship.—The name of Cornelius Randall, Esq., being also proposed as a new director, a poll took place, which occupied a considerable time. At the close, his Lordship declared the result to be—

	Shareholders.	Votes.
For Mr. Charles Appleby	24 . . .	593
George Sidebottom	23 . . .	568
Thomas Ellison	19 . . .	433
Joel Sidebottom	13 . . .	329
David Waddington	11 . . .	263
Cornelius Randall	7 . . .	172

The CHAIRMAN then declared the first four gentlemen, who were the retiring directors, duly elected.—The Rev. R. BASSNETT moved, that the

best thanks of the company should be given to the directors, for their assiduous attention to the interests of the company.—The Rev. W. WHITELEGG seconded the motion, which was unanimously agreed to.—W. SIDSBOTTOM, Esq., the vice-chairman of the board, acknowledged the compliment.—MICHAEL ELLISON, Esq., of Sheffield, said, in proposing a vote of thanks to the chairman, he did it, not merely in reference to his conduct on this occasion, but in testimony of the great zeal and interest he had displayed towards the undertaking since its commencement. As chairman of the board of directors, he was sure he spoke their sentiments when he said that his Lordship had rendered great and important services to this undertaking. He begged to propose, "That the cordial thanks of this meeting be given to Lord Wharncliffe, not only for his able conduct in the chair on this occasion, but also for the great zeal and attention with which his Lordship had supported the interests of this company, in his situation as chairman of the directors."—G. SIDSBOTTOM, Esq., seconded the motion, which was carried with great applause.—Lord WHARNCLIFFE, in returning thanks, assured them he should be at all times anxious for the prosperity of the undertaking; and he hoped it would be carried out, not only to the satisfaction of the shareholders, but to the credit of those persons who had to conduct it through the difficult stages it would have to pass. He thanked them most sincerely, and assured them he should be at all times ready and anxious to promote the interests of the undertaking as far as lay in his power.—This concluded the business of this satisfactory meeting.

Thames Haven Dock and Railway.—This company have met, and their report was read, but the meeting stands adjourned to May 2d.

The Thames Tunnel.—This undertaking continues to make very satisfactory progress. Since December last 30 feet of the tunnel have been completed, making the length of it up to the present time of 855 feet. It is now advanced about 130 feet beyond the situation of the old shield, and to within 65 feet of low water-mark on the Wapping shore.—*Times.*

Taff Vale Railway from Merthyr to Cardiff.—Merthyr Tydfil is the site of iron-works on the most extensive scale, including the two vast establishments of Dowlais and Cyfarthfa, which are little townships in themselves, sprung solely from the iron manufactory, under the spirited direction of Sir John Guest and Co., and the Messrs. Crawshay. Merthyr is situated near the northern boundary of Glamorganshire, at the head of the Vale of Taff, celebrated for its rich and thick veins of coal, as well as for its romantic beauty: its distance from the sea-port of Cardiff is about 24 miles, and the communication with the port has hitherto been solely by means of the Glamorganshire Canal, which traverses the valley by the assistance of numerous locks, and terminates in a floating harbour, opening into Penarth-roads. This port is now undergoing improvement, on a scale of great magnificence, at the expense of the Marquis of Bute, and promises, in a short time, to furnish accommodations for shipping of large tonnage, unequalled by any in the Bristol Channel. The traffic between these points, and the collieries branching out of the Vale of Taff, as proved before the Parliamentary Committee, amply justified the application for powers to construct the railway now in progress; it being proved to demonstration, that the canal was utterly inefficient for the purposes of transit, and would necessarily become still more unequal to the trade, as it went on annually increasing. It is, however, sufficiently well known, that to demonstrate the reasonableness of a proposed Act of Parliament, and to obtain such Act, are not always contingent. In the present instance, a severe struggle preceded the attainment of the desired object. The Glamorganshire Canal Company, naturally watchful over its own interests, speedily organized an active and powerful opposition, which was ably and most assiduously backed by the jea-

bousy of influential parties connected with the rival trade of Newport, and the Monmouthshire collieries. Objection after objection, and claim upon claim, were urged with all the force of combined tact and ability, whilst the ingenuity of protracted debate was taxed to the utmost, for the purpose of defeating the measure by delay, till the expiration of one session of Parliament, should give the enemy breathing time against a renewal of the conflict. To meet this phalanx of difficulties, the managing committee, in the exercise of a sound discretion, determined on making pecuniary sacrifices, the amount of which, however apparently large, would have been greatly exceeded by the cost of protracted litigation; and thus the opposition was ultimately conciliated in some points, and vanquished in others. This was not accomplished, however, without prolonged efforts, both mental and physical, of the managing directors and their solicitors, which nothing but the magnitude of the benefits in view would have justified them in undergoing. The low rates of tonnage on the canal, having been strenuously urged as a plea against establishing a rival undertaking, it became necessary to meet this objection by adopting the lowest practicable rate of charges for the railway; and the limited dividend of eight per cent., which the Canal Company was content to receive, giving all the surplus profit in drawback to the freighters, involved the further necessity of submission to a similar limitation on the railway. This restriction was, however, varied, as we understand, at the suggestion of several members of the committee, who neither were, nor are likely ever to be, freighters on the line, and therefore interested solely in securing the largest attainable return on their investments as shareholders. It was consequently agreed upon to fix on a *minimum* of seven per cent., and a *maximum* of nine per cent., subject to a drawback of 25 per cent. to the freighters, before the latter interest should become available. This deduction does certainly appear unreasonably large, and strikes us as throwing an undue advantage into the hands of the iron and coal workers at the expense of the other capitalists in the concern; we are not, therefore, surprised that the clause introduced into the Act for the above object has occasioned much dissatisfaction: and the shareholders will do well to consider whether they cannot find a good *locus standi*, at some future day, for obtaining an emendation of their Act, which, we are informed, would not be opposed by the great freighting interests. Meanwhile, calculations on the present actual traffic show a result highly encouraging to the proprietary, the amount of trade positively engaged to the railway carrying out a yearly revenue of (say in round numbers) 50,000*l.*, exclusive of passengers, without taking into consideration one of the largest iron-works, and numerous smaller establishments, whose interests will naturally lead them to employ the same means of transit. The increase of trade in localities so peculiarly adapted to it, cannot be a matter of doubt, though it would be difficult to calculate its probable extent. It has been urged in controversy, on the comparative merits of the Taff Vale Railway and the Glamorganshire Canal, that the tonnage on the latter can be lowered to a point that will set all competition at defiance, except so far as speed and the non-intervention of drought and frost are concerned. The fallacy of this opinion appears, nevertheless, to have been demonstrated by intelligent parties connected with the trade, whose calculations show that the present cost of conveying coals by canal, exceeds the tariff in the Railway Act by at least 1*s.* per ton: this calculation very properly includes all expenses incurred by the coal-owner in availing himself of the present mode of conveyance; the item of tonnage being less than one-fourth of such actually increased cost. Thus it would appear that even if the canal were thrown open to the public *gratuitously*, the railway would offer advantages that would still give it the advantage. It would be wrong to pass over one interesting feature in the Taff Vale Railway; that is, its having two termini at the coast. One we have already

incidentally named, and Cardiff appears to be, so to speak, the *appropriate* terminus of the line; but the mouth of the river Ely, which is confluent with that of the Taff, under Penarth-point, presents an harbour of greater *natural* advantages than the ancient port of Cardiff, and became an object of peculiar interest to the projectors of the railway, as affording a valuable resource for all shipping purposes, irrespective of any foreign control; whilst it offered an important adjunct to the trade of the railway, as the certain shipping place of coals. A very fine frontage to a navigable river, has been put into possession of the company, in connexion with this branch of their road, and will doubtless be brought into extensive use for its advantage. The Taff Vale Railway is making rapid progress with its works, under the able management of Mr. George Bush, the company's engineer, who expects to have a large portion of the line in working order by the end of the year. We are informed that the calls on the shares are remarkably well paid up, 55*l.* per share having been paid on the 100*l.* share, and that the shares are, for the most part, held by very substantial parties. The sum of 100,000*l.* is now raising by debentures, according to the provisions of the Act, and of these more than two-thirds are already taken up, though the issue has commenced very recently. In common with other similar undertakings, this railway may cost more than the original estimate: but those who have the best practical acquaintance with the district seem to be content to set the probable increase of trade against the certain increase of capital, and to entertain no apprehensions with regard to the result. On the whole, our impression of the peculiar advantages assumed for this comparatively obscure line of railroad is much in their favour, and we anticipate its attracting a larger share of public attention in proportion as its locality, and the facilities it so evidently offers for extended trade become better known. The report of this company reached us too late for this number.

EASTERN COUNTIES RAILWAY AND BALLOT.—FIVE DIRECTORS AND THE SECRETARY OUT.

THE majority with which the old directors were displaced, and five highly respectable gentlemen of Liverpool elected in their stead, was the overwhelming one of near 3 to 1. Though the poll was not finished until near 11 at night, the new direction immediately held a board at which the secretary was not present, but in a neighbouring room, and a resolution was then and there come to affecting his position. We do not know the exact tenour of this prompt resolution, but we can assure our readers it was not that the board would go into mourning if he was out of the concern; for the next day's sun did not set with him as secretary, and they are not in mourning.

The great and important change that has been produced in this concern must be exceedingly gratifying to the shareholders. As a first instalment of reform, it is a very good one. We are sure the proprietary must feel deeply grateful to the gentlemen of Liverpool for their firmness in producing it. As to our humble selves, we have pursued one unflinching course for the benefit of the concern. Neither the solicitations or entreaties of friends, nor indirect attempts to bribe us, have had any more effect than the machinations, law-suits, or threats to ruin us have. Knowing our object was an honest and good one, we have never ceased to denounce the mismanagement of the concern, and the great change, and immense majority with which it was carried out, is highly complimentary to us, because it proves to demonstration that we have been right.

A very lachrymose stir is making by the ex-secretary's paper about the manner in which the great change has been effected. This is very natural,

for 800*l.* a-year is not to be obtained every day. It is also of course natural, considering whence it comes, that the statements should be well spiced with invention. We do not complain of this, but we do indignantly complain when Samuel Girdlestone, barrister-at-law, and Sir John Campbell, her Majesty's Attorney-General, are held up as so ignorant of the English language as not to know the meaning of the common word "*ballot*." This we, in defence of the character of the British bar, pronounce to be a wicked, impudent, foul, malicious, slanderous, atrocious libel, and we doubt not that the Attorney-General and Mr. Girdlestone will immediately prosecute the audacious paper for it. The Attorney-General is made to say, "*The Act of Parliament, 'by BALLOT among themselves,' clearly means by LOT or CHANCE, and the plan of striking out names by design is not BALLOT.*" Mr. Girdlestone is also represented as having said, "*The BALLOT is the only legal mode of determining which of the original directors are to go out, * * and any attempt to SELECT PARTICULAR INDIVIDUALS FOR EXCLUSION, or to exclude them by striking out their names, will be illegal and ineffectual.*" Now to attribute such language as this to these gentlemen, is the richest thing in libellous impudence we ever heard of. Why it is tantamount to saying they must go back to school to finish their education, as we shall now prove by quotations from Dyche and Johnson's dictionaries:—

"*Ballot*.—To vote for, or choose a person into an office by means of little balls of several colours, which are put into a box privately, according to the inclination of the chooser or voter, or by writing the name or names of the candidates upon small pieces of paper, and rolling them up so that they cannot be read, which are put in a box, &c., and when the time limited for the election is over, an indifferent person takes them out one by one, and upon reading the name or names somebody takes down the number of votes, the greater of which are declared duly elected."—*Dyche*.

"*To Ballot*.—To choose by ballot, that is, by putting little balls or tickets, with particular marks, privately in a box; by counting which, it is known what is the result of the poll without any discovering by whom each vote was given."—*Johnson*.

Is there any lot or chance here? Is there anything of the kind in the ballot so often talked of in the House of Commons? Oh Robertson, Robertson, if thou art the author, thou art a bold fellow to publish such things of the head of the bar of England, and of a Member of Parliament.

But the measure of ignorance and falsehood of this audacious scribbler is not yet full. He says that all the acts done by the present board are illegal. Readers, in all railway Acts that we have seen, there are clauses expressly to prevent any let or hindrance from irregularities in elections, no doubt to guard the business of the concerns from being captiously impeded. Read, for instance, what the Eastern Counties Act says, pp. 99 and 100, § 149: "*And be it further enacted, that the orders and proceedings of all meetings * * of the said directors * * shall be deemed original orders and proceedings, and shall be allowed to be read in evidence in all courts, and before all judges, justices, and others, and that without proof of such respective meetings having been duly convened, or of the persons * * being directors * *, all of which last-mentioned acts shall be presumed.*" Again, in § 162, pp. 107 and 108, in order that the calls may be duly enforced, it is enough, as far as the directors are concerned, to prove that the person was a proprietor, and indebted in about the amount demanded, "*without proving the appointment of the directors who made such respective calls, or any other matter or thing whatsoever.*"

We have now shown, first, that the directors were legally elected according to the literal meaning of the word "*ballot*;" and secondly, even if they were not, that by the Eastern Counties Act of Incorporation all

their deeds are valid. What invention will the "Scaramouch" of the "Railway Times" have recourse to next?

By our No. for January, p. 583, we find that the ex-directors were balloted out December 18, just ten weeks before the election. Will "Scaramouch" tell us why he did not denounce the scratching system during all this time? Was it out of regard for the ex-directors, or out of fear for the ex-secretary's 800*l.* a-year, and which all the splitting of votes and puppets put up for shareholders could not save at last?

We have no space or time for discussing the ridiculous crudities which the "weakly" editor "weakly" brings forward to try to pave the way for the ex-secretary's re-admission into office. If the shareholders knew how things have been managed, and the desperate state into which the company's affairs have been placed, they would rejoice at any change.

Look, for instance, at the late unparalleled case of "theft, swindling, and forgery," in the company's offices; could that have happened if the company had been well-directed and officered, and vigilantly watched? Look, again, at the present blundering balance-sheet, which we in sincere compassion, and in strong hopes that the company may now go on better, pass over. But, worse than all, look at near 2,000 shares bought up by the company—for what earthly purpose, but to bolster up the prices of the shares and give them a false value? It is the more full development of these things just now, aided by a temporary decline in railway property, that have dismayed the public and sent the shares down. If it be asked whether we attribute all this to the retired directors, or to any intentional misconduct on their part, we answer, certainly not. In private life we believe them to be very worthy and respectable gentlemen, but there is much more than this wanting to make useful and good directors. The faults of many gentlemen at the board have been an inability to attend, and a lofty consciousness of rectitude in themselves, which impresses them with a too easy credulity and confidence in others.

We perceive the ex-secretary's paper now talks of a law-suit against the present directors. Poor fellow! poor fellow! We hope there are vacancies in Bedlam, for it is quite evident they may soon be wanted.

We received the following at a late hour:—

"Sir,—You've heard of a tub thrown to a whale; you might have seen it beautifully exemplified at the last general meeting of the proprietors of the Eastern Counties Railway. The man of peculiar talent, fearing that awkward and very puzzling questions might be put to him regarding the balance-sheet, books, correspondence, defalcation of clerks, &c., &c., thought proper to lead the attention of the meeting to some other subject, and with the assistance of two or three hirelings, who a few days before had two or three shares each transferred to them to qualify them for taking part in the proceedings, managed so to nail the ears and attention of his auditors, or the greater part of them, to the ridiculous subject of the balloting of the directors, that all the rest was lost sight of, and he escaped such an exposé, as would have settled him *in futuro*. How strange, that so many shareholders as were then present, could suffer themselves to be so *tricked*! How is it that the ex-secretary made so hasty a retreat after the election of the new directors? 'Give an account of thy *secretaryship*, for thou mayest be no longer *secretary*,' would have been a command much more easily given than obeyed. *He could not give an account*, and knowing that it would be required, he *bolted*, and now with all the envenomed feeling of a man who has overreached himself, he is exerting himself in writing in his 'Railway Times' all the lies and absurdities he can coin against the concern which has so long, so foolishly, and so much against its own interest, fostered and maintained him.

"You *know* the man, Sir, and I trust you will so show him up in your magazine, as to open the eyes of the railway public to his efforts and

designs to depreciate a property against which nothing can be said, but that it laboured so long under the infliction of his mismanagement, that it may take some time to bring its affairs into tolerable order.—Yours,

March 25th, 1839.

A SHAREHOLDER.

[We have also received the following, still later, but we give it a place.—Ed.]

The writer of the following remarks begs to apologize to the editor of the *Railway Magazine* for the late period at which he offers his suggestions, but trusts that, as a sincere friend to the interests of railways in general, the Editor will, out of them, adopt such as he thinks worthy of attention.

The recent proceedings of the Eastern Counties Railway Company have excited much remark in that unprincipled journal, the "*Railway Times*," chiefly, it is believed, because the result has been the resignation (?) of the late secretary, Mr. Robertson, whose vagaries have for some years past been replete with mischief to that company, and whose connexion with the "*Railway Times*," has for some time past been too notorious for even his brazen impudence to deny.

The assertions made, and the cases quoted, in the above journal, as having been submitted to the Attorney-General and to Mr. Girdlestone, with their opinions, only show the facility with which an opinion of any kind required, can be obtained from the most eminent legal authorities, and the carelessness and utter inattention to the obvious meaning of words, great men are sometimes capable of; as a little care in consulting a dictionary would have kept both these high legal authorities from committing themselves.

The most eminent lexicographers, as Ash, Bailey, Webster, Johnson, and the compilers of the "*Penny Cyclopædia*" concur in the interpretation of ballot or balloting, as implying selection or choice, and in fact, the very reverse of chance or lot, and the terms of the Eastern Counties Act for the order of retirement of the directors are, that it "be determined by ballot among themselves." The same phraseology is used in the Act of the Commercial Railway; the Thames Haven Dock and Railway; the Birmingham, Bristol, and Thames Junction Railway; the Great North of England; the York and North Midland; the Midland Counties; the Grand Junction; the North Union; the South-eastern and Dover; the London and Brighton; the Great Western; the London and Birmingham; the London and Southampton; and the North Midland Railways; and of these, the directors of the last six have adopted the mode of determining the order of retirement, as the Eastern Counties, by ballot among themselves; whilst, as if for the purpose of placing the matter beyond a doubt, the Legislature have thought fit, in the Sheffield and Rotherham Act, to adopt a different phraseology, there enacting, that the order of retirement of the directors shall be determined by lot among themselves; and in the case of the Act for the Metropolitan Suspension Bridge, they have not only directed that the order of retirement shall be by lot, but have particularly defined the mode of conducting the lotting.

The remark in the "*Railway Times*," of the 23d inst., that "In the opinion of the Attorney-General and Mr. Girdlestone, it must be such a ballot as will exclude all design and selection," is too ridiculous a contradiction in terms to deserve notice; and the opinions held by more than one sound lawyer, that where the Act prescribes ballot, all elections which have been by lot are illegal, seems by much the more rational, inasmuch as it is a deviation from the strict letter of the Act of Parliament, which is not justifiable even with the consent of every individual director.

The pretence, that the mode of lot is to be adopted because it appears to be the practice of Parliament in what they miscall balloting for Committees, is the only pretext which appears to have any plausibility to recommend it, but the usage even of Parliament, surely cannot be quoted to contravene the positive terms of their own enactment.

By the way, the ex-secretary, in the leader above-quoted, attempts to be witty on the alleged inconsistency pointed out, as he says, by a Bristol correspondent (query, one nearer home?) that the ballot was necessary for the salvation of the Eastern Counties Railway; an allegation, "which he contrasts very pleasantly with a passage in a letter which has been handed about in Bristol from one of the Liverpool directors of the Eastern Counties Railway, (query, Mr. Rathbone, himself!) where the prospects of the concern are described as good, solid, and cheering, and no necessity for any such expurgatory process is once hinted at."

Now, suppose the ex-secretary for once is right in his supposition, and that the letter in question was from Mr. Rathbone, might not that gentleman with perfect confidence speak of the prospects of the concern as "good, solid, and cheering," knowing, as he then must have done, sufficient of the feelings of the influential shareholders of Lancashire, to feel satisfied that they were determined to move with effect at the next meeting, and to get rid of the inefficient part of the board of directors, or failing that measure, to adopt an effectual mode at the meeting, of getting rid of the incubus—his secretaryship.

PARLIAMENTARY PROCEEDINGS.

HOUSE OF COMMONS.

BALLOCHNEY RAILWAY, March 1, petition reported and Bill to be brought in by Mr. Lockhart, and Mr. Dennistoun; March 14, "to enable the Company to raise a further sum of money;" read 1st, to be read 2d.—**BRISTOL AND GLOUCESTERSHIRE**, March 5, pet. for Bill rep., to be brought in by Mr. Philip Miles, and Mr. H. Hope; March 7, for altering and extending the line of the Co., and for amending the Acts relating thereto, read 1st, to be read 2d; March 18, pet. from Stroud, in favour, to lie on the table; March 19, pets. in favour—from Wells, Bridgwater, St. George, Stapleton, and other places; Bristol, Taunton, Wotton-under-Edge, Cirencester, Tewkesbury, Wickwar and Kingswood, Directors of the Bristol Dock Company, Bristol Chamber of Commerce (President), Bristol and Exeter Company, Birmingham and Derby Company, and Birmingham and Gloucester Company; to lie on the table; March 19, read 2d, and committed to H. T. Hope, and West Gloucester list.—**BIRMINGHAM AND GLOUCESTER**, March 6; pet. for Bill ref., rep., ref. to Select Committee. March 14, rep. (8th March) from Select Committee on standing orders, read; Bill ordered to be brought in by Mr. Hope and Mr. Philpotts; March 15, "to amend the Acts relating to the Company," read 1st, to be read 2d.—**BISHOP AUCKLAND AND WEARDALE**, "for enabling the Company to complete their railway and other works, and for amending an Act of Her present Majesty relating thereto;" pres. and read 1st, to be read 2d.—**CROYDON, MERSTHAM, AND GODSTONE**, March 5, pet. for Bill rep., to be brought in by Capt. Alsager and Mr. Kemble.—**COMMERCIAL (LONDON AND BLACKWALL)**; Feb. 27, pet. rep., and bill to be brought in by Mr. Alston and Mr. T. Duncombe; March 8, "for extending the line, and for amending the Acts relating thereto; read 1st, to be read 2d; March 11, pet. of J. Tulloch against, to lie on the table; March 21, proposed to be read that day 6 months, noes 64, ayes 80; read 2d, and committed to Mr. T. Duncombe and the Middlesex List; March 25, pet. of the Lord Mayor, Aldermen, and Commons, of the city of London, against, ref. to the Committee on the Bill, counsel ordered.—**DEPTFORD PIER JUNCTION RAILWAY**; March 14, pet. for Bill rep., report ref. to the Select Committee.—**DEAN FOREST RAILWAY**, March 1, pet. Sir T. Crawley Bovey, Bart., and others, complaining of non-compliance with the standing orders; ref. to the Select Committee; March 7, pet. of the Rev. Edw. Jones and Sir T. Crawley Bovey, Bart., complaining of non-compliance with the standing orders, ref. to the Select Committee; March 14, pet. for Bill rep., report ref. to the Select Committee.—**EDINBURGH, LEITH, AND NEWHAVEN**, March 1; pet. of J. Richardson and John Connell, complaining that the standing orders have not been complied with; ref. to the Select Committee; March 8, pet. for Bill rep., and Bill ordered to be brought in

by Mr. Gibson Craig and Mr. Attorney-General.—**GREAT NORTH OF ENGLAND**, March 4; pet. for Bill rep., report ref. to Select Committee; March 12, rep. (8 March) from Select Committee read; Bill to be brought in by Mr. Pease and Mr. Harland; March 13, for amending and enlarging the provisions of the several Acts relating to the Company, and for other purposes relating thereto; presented, read 1st, to be read 2d.—**GREAT CENTRAL IRISH (CELBIDGE AND MULLINGAR)**, Feb. 25; pet. for enlarging the times to pres. a pet. for a Bill, rep.; time enlarged until the 11th March; March 7, pet. for further enlarging the time for presenting a pet. for a Bill; ref. to the Select Committee; March 12, pet. for leave to pres. a petition for a Bill; reported; leave given.—**GREAT WESTERN**, Feb. 27; pet. rep., and Bill to be brought in by Mr. W. Miles and Mr. Philip Miles; March 4, to amend the Acts relating to the Company, and to raise a further sum of money for the said undertaking, presented, and read 1st, to be read 2d; March 13, read 2d, and committed to Mr. W. Miles and the East Somerset List; March 25, rep.; rep. to lie on the table.—**LONDON AND CROYDON**, March 14; pet. for Bill rep., report ref. to the Select Committee; March 18, rep. (this day) from the Select Committee, read; Bill to be brought in by Capt. Alsager and Mr. Kemble; "to amend and enlarge the powers and provisions of the several Acts of the Company," pres.; read 1st, to be read 2d.—**LONDON AND BIRMINGHAM**, March 6; read 2d, and committed; pet. of J. Robins against; ref. to the Committee on the Bill, counsel ordered; March 11, Committee nominated of Mr. Dugdale and North Warwick List.—**LONDON AND BIRMINGHAM AND MAILS**, March 13; ordered the times of departure from, and arrival of the mails at the various places on the line as settled by the Post-office, and as they actually did happen since the opening of the North Union Railway; March 19, same order further extended.—**LONDON AND GREENWICH**, March 14; pet. for Bill rep., and bill to be brought in by Mr. Wolverley Attwood, and Mr. Barnard; March 18, "for granting further powers to the Company," presented; read 1st, to be read 2d.—**LONDON AND SOUTHAMPTON (PORTSMOUTH BRANCH)**, Feb. 25; to amend the Acts relating to the Company, and to make a branch therefrom, to the port of Portsmouth, pres. and read 1st, to be read 2d; March 7, pet. in favour, from Southampton, Fareham, Gosport, Titchfield, and Winchester; to lie on the table; read 2d, and committed to Mr. Shaw Lefevre, and the South Hants list. Petitions against, from the inhabitants of Twyford, and other places, and Portsmouth; referred to the Committee on the Bill; March 13, pet. of the Rev. R. Bingham against, ref. to the Select Committee, counsel ordered; March 25, rep., report to lie on the table.—**LIVERPOOL AND MANCHESTER EXTENSION**, Feb. 27; pet. reported, and Bill to be brought in by Lord Viscount Sandon and Mr. Cresswell; Feb. 28, to enable the Company to extend the line, and to amend former Acts; read 1st, to be read 2d; March 12, read 2d, and committed to Lord Viscount Sandon, and the South Lancashire List.—**MONKLAND AND KIRKINTILLOCH**, Feb. 25; pet. rep., and Bill to be brought in by Mr. Lockhart and Mr. Dennistoun; March 14, "to enable the Company to raise a further sum of money," pres.; read 1; to be read 2.—**MANCHESTER AND LEEDS**, Feb. 25; pets. complaining of non-compliance with the standing orders; from Henry Taylor, Esq., and Joseph Jones, Esq.; ref. to the Select Committee; March 4, pet. for Bill ref.; and report to lie on the table; March 5, report (March 4) from the Select Committee; Bill to be brought in by Lord Stanley and Mr. Mark Phillips; March 8, "for extending and for altering the line, and for making branches therefrom, and amending the Acts relating thereto;" read 1; to be read 2; March 19, read 2; and committed to Lord Stanley and the South Lancaster List.—**MANCHESTER AND BIRMINGHAM EXTENSION (Stone and Rugby)**, March 11; pet. of the corporation of Congleton, in favour of the application; to lie on the table; March 21, pet. of owners and occupiers of lands on the proposed line of the Company, complaining of non-compliance with the standing orders, ref. to the Select Committee.

MANCHESTER AND BIRMINGHAM, March 4th; pet. for Bill, ref., and Bill ordered to be brought in by Mr. Bootle Wilbraham and Lord Francis Egerton; March 18th, "to the Co., to vary and extend the line, and to amend the Act relating thereto;" read 1st; to be read 2d.—NORTHERN AND EASTERN (No. 1), March 15; pet. for Bill, ref., and Bill ordered to be brought in by Mr. Ward and Mr. Marshall; March 18, "to amend and extend the powers of the Co's. Act; read 1; to be read 2.—NORTH UNION, March 7; pet. for Bill, ref. to Select Committee.—NEWCASTLE AND NORTH SHIELDS (Tynemouth Extension), March 8; pet. for Bill ref., and Bill to be brought in by Mr. Bell and Mr. Hodgson Hinde; March 15, "to authorize the Company to make a railway from the termination of their present line at North Shields to Prior's Haven, in the township and parish of Tynemouth, both in the county of Northumberland;" pres. and read 1; to be read 2.—NORTHERN AND EASTERN (No. 2), March 8; pet. of T. Nias, complaining of non-compliance with the Standing Orders; ref. to the Select Committee; March 12, pet. of Richard Davis, complaining of the non-compliance with the standing orders; referred to the Select Committee; March 14, pet. of Henry Sandford, Esq., against the application, to lie on the table; March 15, pet. for Bill, ref.; rep. ref. to the Select Committee; March 21, rep. (March 20) from Select Committee read; Bill to be brought in by Messrs. Ward and Marshall; leave given to present the Bill on or before Wednesday next.—NORTH MIDLAND, Feb. 27; pet. ref.; rep. ref. to Select Committee; March 1, rep. from the Select Committee on Standing Orders (this day) read; Bill ordered to be brought in by Mr. Baines and Mr. John Parker; March 4, to alter the line, and amend the Act; read 1; and to be read 2; March 14, read 2; and committed to Mr. Baines, and the West Riding of York list; March 19, pet. of the trustees of Chas. Bradley and others against, ref. to the Select Committee; counsel ordered March 21, pet. of Proprietors of the river Dun Navigation against, ref. to the Committee on the Bill.—PRESTON AND WYRE RAILWAY AND HARBOUR, AND PRESTON AND WYRE DOCK COMPANY, March, 6; pet. for Bill, ref.; and Bill to be brought in by Sir Hesketh Fleetwood and Mr. Wilson Patten; March 18, "to amend the several Acts relating to the Company, and the Preston and Wyre Dock Company, and to consolidate the said Companies;" pres., and read 1; to be read 2.—PRESTON AND WYRE RAILWAY, March 4; read 2, and committed; March, 9, Committee nominated of Sir Hesketh Fleetwood and the North Lancaster List; March 14, ref. to be engrossed; March 15, read 3, and passed.—SOUTH-EASTERN (Deviation), March 8; pet. for Bill, rep.; Report ref. to the Select Committee.—SLAMANNAN, March 1; pet. rep., and Bill to be brought in by Mr. Lockhart and Mr. Dennistoun; March 4, order for Bill (March 1) read and discharged; report recommitted to the Select Committee; leave to committee to sit and proceed thereon to-morrow; March 12, pet. for Bill rep.; ref. to the Select Committee; March 15, report (this day) from Select Committee on standing order read; Bill ordered to be brought in by Mr. Lockhart and Mr. Dennistoun; March 18, "for enabling the Company to raise a further sum of money;" read 1; to be read 2.—SOUTH-EASTERN, Feb. 25; pet. rep., and Bill to be brought in by Mr. Hodges and Mr. Edward Rice; Feb. 27, to alter the line, so as to connect it with the London and Brighton, and amend the Acts relating to the Company; pres., and read 1; to be read 2; March 1, pet. complaining that the standing orders have not been complied with; from the Brighton Company; and William Ward and Frances Ann Ward; ref. to the Select Committee; March 12, pet. complaining of the non-compliance of the standing orders; from Ann Cussell and J. Caulstock; and W. C. Burt and others; ref. to the Select Committee; March 25, read 2; and committed

to Mr. Law Hodges and the East Kent List.—WEST DURHAM, March 14; pet. for Bill, ref.; Bill to be brought in by Mr. Pease and Mr. Lambton; March 18, "for incorporating certain persons for making and maintaining from the township of Crook and Billy Row to the Byers Green Branch of the Clarence Railway, in parish of St. Andrew, Auckland, all in the county of Durham, to be called the West Durham Railway;" read 1; to be read 2.—WISHAM AND COLTNESS, March 1; pet. ref. and Bill to be brought in by Mr. Lockhart and Mr. Dennistoun; March 14, "to enable the Company to raise a further sum of money;" pres., read 1; to be read 2.

RAILWAYS (IRELAND).—Feb. 25, pet. from Ballyshannon, for the adoption of measures of the commissioners, to lie on the table; Feb. 27, pet. of the Dublin and Kilkenny line, for an inquiry into the facts connected with the appointment of the commission, to lie on the table, and be printed; March 1, pets. for consideration of several proposed lines of railway in Ireland; from Dublin and Drogheda Railway Company (chairman); Carlow; Wm. Young; Nenagh; and Carrick-on-Suir, to lie on the table; pet. for appointing a Select Committee to determine the best lines; from Limerick; and landowners, gentry, and others, from the four provinces of Ireland, to lie on the table; pet. from Armagh, for carrying into effect the report of the commissioners, to lie on the table; resolution that 2½ millions be applied to construct the line from Dublin to Cork, carried by 144 to 100.—Return pres., showing the expenditure of the commissioners [ordered 12th Feb.], to lie on the table; March 5, to be printed.—March 7, pet. from Dublin [Lord Mayor] for facilitating intercourse in Ireland by means of railroads; to lie on the table.—March 8, pets. for consideration of several proposed plans of railways in Ireland; from Kilkenny; and the General Irish Railway Committee; to lie on the table; pets. for carrying into effect the recommendations of the commissioners; from Cork; and Clare; to lie on the table.—March 11, pet. of grand jurors of the county Limerick, in favour of the proposed measure; to lie on the table; pet. of the chairman of the General Irish Railway Committee against the proposed measure; to lie on the table.—March 13, pet. for the survey of the province of Connaught, with a view to the establishment of railroads therein; from Roscommon, and province of Connaught; to lie on the table; pet. of owners and occupiers of houses and demesnes in the county of Dublin, against the adoption of any plan which would prejudice their interest, without an opportunity of being heard against the same; to lie on the table.—March 14, pet. from Athenry, praying that the province of Connaught may not be excluded from the contemplated measure; to lie on the table; of the grand jurors of the county of Kerry, in favour of the proposed measure; to lie on the table.—March 18, pet. in support of the proposed measure from Ballinasloe, Tuam, landowners and others interested in the construction of railways in Ireland; to lie on the table; from proprietors and others interested in the welfare of the province of Connaught, praying that that province may not be excluded from the benefits of the proposed measure; to lie on the table; from Wm. Bryson, against the proposed measure; to lie on the table.—March 21, motion made and question proposed, "that an humble address be presented to her Majesty, that her Majesty will be graciously pleased to direct measures to be taken for securing to every province in Ireland the advantages of railroad communication."—March 25, copy pres. of resolutions and memorials to the Irish Government, or the Chancellor of the Exchequer, respecting railways in Ireland [ordered 22d Feb.] to lie on the table; pet. from city of Cashel in favour of Government plan.

Railways, March 4, address for return of all bye-laws made under the authority of any Acts relating to railroads, imposing penalties upon any persons other than those in the service of the said company.

PRICES OF RAILWAY SHARES.

Those finished are marked (1); in progress (2); which have their Bills, but are not begun (3); others (4).

NAMES OF RAILWAYS.	No. of Shares.	Share.	Paid.	Prices sold at.			Dividend per Cent.
				High. est.	Low. est.	Latest Price.	
(2) Birmingham and Derby . . .	6,300	100	£. 60	49	46½	46½	(a)
(2) Birmingham and Gloucester . .	9,500	100	40	22	20½	20½	
(2) Birm., Brist., & Thames Junc. .	7,500	20	18	...	...	9
(2) § Bristol and Exeter	15,000	100	20	10½	5	5	
(2) † Cheltenham and Great Western	7,500	100	20	7	7	7	
(2) * Chester and Crewe	5,000	50	25	25½	24½	24½	
(2) * Do., Birkenhead	5,000	50	25	35½	33½	34½	
(2) Commercial, Blackwall	24,000	25	9	7	6	6	
(3) † Dublin and Drogheda	6,000	100	10	9½	7	7	
(2) Eastern Counties	64,000	25	13	10½	8½	8½	
(2) Edinburgh and Glasgow (old)	18,000	50	10	7	7	7	12
Ditto, ditto (new)	5,000	...	5	...	...	4
(2) Edinburgh, Leith, & Newhaven	5,000	20	7	...	...	4
(2) † Glasgow, Paisley, and Greenock	16,000	25	8	8	8	8	
(2) † Glasgow, Paisley, and Ayrshire	12,500	50	15	12	7	12	
(1) * Grand Junction (ex. div.) . .	11,400	100	100	207	205	207	
(3) * Great Leinster and Munster .	8,000	100	5	18s 6d	18s 6d	18s 6d	
(2) Great North of England . . .	10,000	100	35	17	16	16	
(2) Great Western	25,000	100	65	78½	70	70	
(4) Harwich	11,000	20	1	½	7½
(2) Hull and Selby	8,000	50	25	15	15	15	
(2) Llanelly Railway & Dock Co.	2,000	100	70	...	...	70
(1) * Liverpool and Manchester . .	7,968½	100	100	204	195	195	
* Ditto ½ shares	546	25	25	47½	47	47½	
* Ditto ¼ shares	7,968	50	50	77	76½	76½	
(1) * Leicester and Swannington .	1,500	50	50	75½	73½	73½	
(2) London and Brighton	36,000	50	17	12½	9½	9½	
(1) Do. and Birmingham	25,000	100	90	170	153½	153½	
Do. ½ Shares	25,000	25	5	29	26½	26½	8
Do. Bonds, 5 per Cent. 1843 . .	...	...	20	...	...	...
(1) Do. and Greenwich	20,000	20	20	17½	16½	16½	
Do. New Shares . . . . .	...	...	20	...	...	19½
(2) Do. and Southampton	20,000	50	50	44½	42	42½	
Do. do. New	16,000	25	20	...	...	40
(2) Do. and Croydon, Trunk	20,000	20	16½	12½	11½	11½	
Do. New Scrip	6,666	20	10½	8½	5½	8½	
(1) § Leeds and Selby	2,100	100	100	68	65	65	
(3) Manchester and Birmingham	30,000	70	15	13½	11	11	3
(4) Do. and Do. Extension	15,000	70	7	5½	4½	4½	
(2) Do. and Leeds	13,000	100	50	64½	64	64	
Do. New Shares	10,000	50	5	12	12	12	
(2) † Do. and Sheffield	7,000	100	7½	5½	3½	3½	
(2) † Maryport and Carlisle	4,000	50	17	7	7	7	
(2) Midland Counties	10,000	100	60	49	48	48	
(1) * Newcastle and Carlisle . . .	6,000	100	100	92½	92½	92½	
* Ditto ½ shares . . . . .	...	25	25	23½	23½	23½
(2) Northern and Eastern	12,000	100	15	5½	4½	5½	14
(2) North Midland	15,000	100	65	55½	49½	49½	
(1) * North Union	3,200	100	100	70½	58	58	
Do. New Shares	3,200	50	50	...	...	64½
(2) Preston and Wyre	2,600	50	44	...	...	42
(3) * South-Eastern and Dover . .	28,000	50	12	3½	3	3	
(1) St. Helen's, Runcorn Gap . . .	...	...	100	...	...	40½
(1) † Stockton and Darlington . .	1,000	100	100	205	205	205	
(3) Thames Haven	9,000	50	5	...	...	...
(2) York and North Midland . . .	6,700	50	20	19	19	19	

* Those with a * are the Liverpool prices, which are to the 23d inclusive. † Scotch.
 ‡ Manchester. § Bristol. The others are London prices to the 25th.

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AND
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NEW SERIES.

A Few Observations on the Raising of Capital, and Hints to Engineers. By the EDITOR.

GREAT difficulties often exist in raising the capital of a railway, however promising it might be. People do not like to keep advancing money for four or five years, on mere speculation, without receiving any return. Many, indeed, who would be willing to embark their money in these undertakings cannot do it. They are unable to spare so much from their income as would be lost in the interest of the money advanced even with almost certain prospects of obtaining a double income hereafter. Hence the finding of the capital for railways devolves upon a small body of large capitalists, chiefly in Lancashire. These gentlemen it is impossible, whatever be their ability, can sustain the constant and large drains almost daily made on them for the immense works carrying on in the various parts of the kingdom. It would not, perhaps, be too much to say, that one-half the capital of all the principal lines is held by the gentlemen of Lancashire. The heavy calls are, consequently, such as they begin to feel very seriously, and hence one cause of the present temporary drooping of this species of property, and of the frequent fluctuations to which it is liable.

We have been assured, that if 500,000*l.* stock was suddenly thrown in upon the market, it would not sink the current prices $\frac{1}{2}$ per cent.; whereas if 100 shares of the best line in the kingdom were so thrown in, the probability is, prices would fall 4*l.* or 5*l.* per share. Hence the amazing influence of one or two of the leviathans of the share market. We have heard of one of these gentlemen merely walking through the London Stock Exchange, and with a shrug of

his shoulders and a shake of his head, accompanied with an exclamation of "Ah! there is a split in the direction, and it is all off in a certain negotiation," (perhaps of no serious importance to the concern) send the shares down 2*l.* or 3*l.* in a twinkling. And we have known them go up as much for equally as futile a reason. Indeed the prices and their risings and fallings, are no guides whatever of the merits of a concern. Probably the rule of contrary would be about the safest that could be followed; the highest premiums should be shunned and the greatest discounts sought; the prospects should be esteemed to be bad when the shares rise, and good when they fall.

Now, in order to remedy the evils complained of, it appears to us the best plan would be to allow an interest of about 4 per cent. per annum on the deposits and calls. Many parties, whose means are not very great, and who now cannot reduce their income to do it, would then be able to enter into these concerns as permanent holders. The effect would be a much more extensive field for raising the capital, and a steadier value to the property, the excessive fluctuations of which are highly prejudicial and discouraging. As a banker observed to us, "We would much prefer 1,000 accounts of 100*l.* each to a very small number aggregating the same amount, 100,000*l.*; for though the trouble is greater, the total sum in hand is much less fluctuating." So it is precisely with railways. The smaller the number of shares held individually, the less likely they are to be parted with. Therefore, every encouragement should be given to men of limited means to become proprietors, and this can only be done by giving them "a bird in hand," and showing them that by having it they will not lose more than a feather out of the tail of "the bird in the bush." We believe the average holders in railway companies is from 1,000*l.* or 1,200*l.* to 1,500*l.* each, but some are very large. There is a gentleman in Liverpool who held above 60,000*l.* capital stock in the Great Western; and parties once told us of their relatives having then in the Birmingham 100,000*l.* original stock. These sums, though but small parts of the total capital, are of large amounts, and perhaps one-half of either sum sent into the Stock Exchange would cause a variation of probably 7*l.* or 8*l.* per share.

Some are averse to paying interest out of capital, and think it bad policy. As a general rule it may be unwise; but the peculiar circumstances alter the case. If this was done, the scope for raising the capital would probably be

twenty or thirty, if not eighty or a hundred times as great. The time of paying the interest is also not long, and the calls being spread nearly uniformly over this time, would reduce it still more.

Let us suppose the time was 5 years from the payment of the deposit to the completion of the line, and let us assume that according to our present standing follies, miscalled standing orders, 10 per cent. must be paid down. About a year is consumed in getting the Act. In the second year there is enough to do to obtain possession of the land and make preparations for undertaking the works. For all this we may assume about 15 per cent. would be called up. In the third, fourth, and fifth years the works generally proceed with uniform vigour, and the calls are pretty equally made. The mean time of payment for the whole capital would then be

$$\frac{10 \times 5 + 15 \times 3\frac{1}{2} + 25 \times (2\frac{1}{2} + 1\frac{1}{2} + \frac{1}{2})}{100} = 2.15 \text{ years.}$$

or say, $2\frac{1}{4}$ years. If 4 per cent. interest was allowed, this would add 9 per cent. to the capital, or reduce the profits by about a fifth. Suppose now a person worth about 4,000*l.*, receiving 200*l.* per annum, or 5 per cent., was desirous of embarking one-half of his property on some good promising line; and let us imagine him to have pretty certain grounds of receiving hereafter an annual profit of 12*l.* per 100*l.* share, and see how he would be circumstanced on the two cases, of paying without interest and of receiving 4 per cent. interest.

	<i>£.</i>		<i>£.</i>	<i>£.</i>
1st year, advancing 10 per cent., or 200, his income would be			198	190
2d do. 15	300	Supporting he receives 4 per cent. interest.	195	175
3d do. 25	500	Receiving nothing.	190	150
4th do. 25	500		185	125
5th do. 25	500		180	100
6th do. and afterwards			320	340

Now, if we examine these two columns, the advantage and consequent inducement for small proprietors to embark their capital where an interest is paid on the money advanced is obvious. Indeed, in 99 cases out of 100 a man with only 200*l.* per annum would never be able to reduce his expenses to 100*l.* per annum, and therefore could not take part in such concerns, whatever may be his inclination or the prospects before him, while he would hardly feel the inconvenience of a gradual reduction to 180*l.* per annum.

If it happened that the individual had bought into the funds when they were at the highest, and was now therefore receiving only about 3 per cent. interest, the advantage

of allowing 4 per cent. on the payments would be still more striking. For example,

	£	£
1st year his income would be with interest	122	without 114
2d ditto	125 . . .	105
3d ditto	130 . . .	90
4th ditto	135 . . .	75
5th ditto	140 . . .	60
6th ditto	320 . . .	340

and the same ever afterwards.

Here he would have an increased income from the moment of becoming a proprietor, and a gradually rising one every year after by allowing 4 per cent. But if there was no interest he gets his narrow income crippled down to one-half, which it is 50 to 1 his situation will not endure.

If interest was allowed, it would of itself also have the effect of steadying the shares. For if there was the slightest prospect whatever of a line being completed, people would never make the wholesale sacrifices they now frequently do with a certain present income.

Another principle we think is to have the shares of a small amount. 100*l.* shares are large and beyond the reach of thousands of persons who would become good holders. We would never have shares to exceed 25*l.* each. It is perhaps not too much to say that for every person who can spare 100*l.* there are at least 20 who can spare only 25*l.* Therefore 19 persons out of 20, where the shares are 100*l.*, would be cut off from participating in the railway, and these small holders are commonly the best. Besides there is another advantage. People do not like to say, I am a shareholder in such or such a concern, and hold but one share. They would rather in such a case conceal it, and deter others of their friends from joining, lest they should discover the nakedness of the land. But they would have no objection to acknowledge 4 or 5 shares, and would encourage others to join them. The same feeling pervades men of a higher grade. "I have just secured a nest egg in the * * * railway," says a gentleman, "for my little ones." "How many shares have you?" "Oh! only a few; about two hundred—it is a capital concern; I would recommend you by all means to have some."

This is a piece of innocent pride by no means unusual; and where is the harm of gratifying it when it contributes so liberally to the benefit of the parties and to the prosperity of works of public utility?

In every point of view it appears to us the plan of allowing interest and making the shares small, would be advantageous. It would exceedingly enlarge the sphere of enterprise; hold out greater inducements to invest permanently in these undertakings; put it in the power of numbers to take shares that now cannot; give greater steadiness to prices; keep the companies more flush of money; and consequently enable them to proceed more vigorously and more economically with their works; and we think it likely in a very great measure to prevent the necessity of having recourse to loans.

We understand the Harwich Company intend to adopt the principle of allowing 4 per cent., and to get a clause introduced into their Act for the purpose. At first it was strongly objected to by several of the present moneyed and influential men who have taken this line up. They considered it a sort of delusion; a taking from the right hand to give to the left. But when the mode of its operation was explained, we understand they fully approved of it.

Probably it will be said, all this may now be done by proprietors paying up their shares in advance, which companies have the power of receiving and allowing interest for. True; but where is the man that will do this though he can, knowing that others are not doing so? There is always a lurking feeling of insecurity, from an idea of disproportional risk, men do not like to run, where the payments of all are not *pari passu*. The proper way would be for each company to have a clause in their Act to permit the payment of interest, in the same way as the Greenwich Company, and we believe some few others, have; for it has been doubted how far even a general meeting of proprietors have the power to authorize the payment of interest without a special clause. Our opinion is, that a meeting of proprietors, convened for the purpose, or a general meeting, of which a due notice of the object has been given, is competent to make any regulation whatever not against the letter or spirit of their Act, and not affecting other parties than the proprietors.

Being on the subject of capital, we cannot help here noticing the silly fears some people are fretting themselves with, about the amount absorbed by the railways. They fancy if these concerns go on that they will shortly swallow up all the floating capital and lock completely the wheels of trade. The best answer is a few facts. By our share list the capital of the lines therein noted is about 36 millions.

Suppose, to take in some few lines not enumerated, and to account for loans, &c., this be doubled, and we shall have 72 millions. Now by an excellent summary of statistical facts illustrating the wealth of Great Britain, in our vol. iii. p. 28, we find that the total annual income of the people of Great Britain is in round numbers 300 millions, that is, about 4½ times as much as the full capital of all the railways made and in operation. If we date the commencement of railroads from 1829, and suppose all the present will be finished in 2 years, the capital abstracted by them will be 2 per cent.—not of the wealth—but of the income only, of the people of Great Britain, during the time they have been making. Is it not the height of absurdity to say that so paltry a fraction can have any serious effect?

We cannot help here touching upon a subject vitally affecting the interests of railways, and through them the interests of the community. We need hardly say we allude to the frequent excesses of cost over the estimates. There is scarcely a line projected in which this does not take place to an extent exceedingly lamentable. Much of it, no doubt, springs from accidental circumstances, such as the rise of materials and labour; some from the shameful exactions of landowners; a part from the expense which haste to finish the works unavoidably entails; another from the vacillating plans of directors; but a great portion—it cannot be concealed—is due to insufficient estimates. In the beginning of times, when novelty shrouded computations with uncertainty, there might be some excuse for failures of estimate, but really there is little or none now. We cannot conceive any difficulty in men that know their profession and only common arithmetic, making an estimate within 10 or 15 per cent. at farthest. It is time the respectable portion of the profession should be on their guard in these matters; and draw, by the accuracy of their estimates, a distinct line of demarcation between themselves and others. Public opinion is growing very strong on this subject. Deep injuries have been inflicted on the confidence and purses of proprietors, and if engineers be not careful, the evils will recoil on themselves with overwhelming fury. There are few lines which, if made for their estimates, would not pay a good dividend; but it is impossible they can where the estimates are perhaps doubled or trebled. We beg to suggest to engineers a resolute refusal to be drawn into hasty calculations. They should insist on sufficient time for perfecting their plans and estimates, and then should firmly adhere to them

and unbendingly oppose any alterations which would increase the expense.

We just touch on these things now, and hope the few hints we have given will have their weight where it is wanted.

If proper time was allowed for examining the country, surveying it, making the calculations, and going into the necessary details, we presume no respectable engineer would object to give security—barring casualties—for the execution of the works at the sum he computes them at. We have spoken to some of them, and they say they would have no sort of objection. We are quite certain it would re-assure the public, and bring back that confidence in the profession which, owing to many wild and random guesses under the name of estimates that have been made, is fast leaving it.

Performances of the Great Western Steam-ship and the French La Véloce. In a letter from CAPTAIN CLAXTON, R.N., Managing Director of the Great Western Steam-ship Company.

TO THE EDITOR OF THE RAILWAY MAGAZINE.

DEAR SIR,—I beg to acknowledge the receipt of, and to thank you for sending me the letter of the Captain of the French man-of-war steamer, *La Véloce*, to M. Arago, comparing her performances with those of the Great Western. Devotion to the science of transatlantic steam navigation would induce one to rejoice in every proof of success, rather than to cavil at the manner in which that success is unfolded; but when national renown is involved, vague and undefined statements such as M. Bechameil's should not be allowed to pass without notice, and more particularly when like his, deemed worthy of a place in the reports of the French Academy of Science.

From M. B.'s letter, I can collect but little of the performance of his ship beyond her having made a passage from Rochefort to the Havanna in about 30 days, and that upon 220-horse power 292 tons of coal were consumed. The distance from the extreme points is under 5,000 nautical miles, and not 5,500, as stated. The consumption of fuel would be just 4lbs. per horse-power, per hour. If the passage, long as it was, were made, "with the unceasing aid of steam,"* the consumption is remarkably low. Lacking information, which the logs only can best give, I am

* Vide title-page to the logs of Great Western's first voyage.

justified in hypothetically treating the subject. Thus then, the distance from Rochefort to Madeira is about 1,200 nautical miles, and that from Madeira, (near the northern boundary of the trade-winds,) to the Havanna, is about 3,500 miles, and in this calculation, I have allowed for deviations in the course. The *Vélocé* is well fitted for sailing upon a principle long since settled for the iron-ship we are building. Presuming economy of fuel to have been an object, and judging by my own past experience on many voyages in the same latitudes, and the voyages of a host of British and Dutch steamers, men-of-war or private vessels, which have for the last ten years been making the same *easy passage*, I venture a guess that whenever *La Vélocé* could sail at the rate of 8 knots, without the aid of steam she did not use "*les deux moteurs*;" another guess, that her log would inform M. Arago that she sailed between 1 and 2,000 miles *without steaming at the same time*, and more than 1,000 miles in the trades with *both powers*. Of the former part of her passage I can venture nothing, except that the wind was fair in England from the 7th to the 17th of December, and she sailed on the 9th. Admit my position, and the consumption of fuel at the common rate of 8 or 9lb. per horse-power per hour, will about cover the distance from Rochefort to the trades—in the trades, when light—and from the Bahama bank to the Havanna, and still leave a few tons. M. Bechameil's observations on the comparative performances of his vessel and our Great Western are not in the best taste. A comparison of the performances of the Liverpool and Great Western in February last should teach him that, to form a true estimate, a passage should not only be made in the same track, but, as far as the rate of going will allow, *at the same time*. The Great Western started on the 28th January, and, for 14 days, encountered a tremendous sea against her, on a straight course, with westerly winds, frequently amounting to gales, although not of so heavy a description as those of the November voyage. The Liverpool started on the 6th of February, and went further south than the Great Western. The Liverpool, although sailing only 9 days after the Great Western, had comparatively fine weather all the way. *La Vélocé*, to obtain "*les eperons*," from either the Liverpool or Great Western, must either go in the winter from France to New York, or against the trades from the Havanna to the Canaries, and even then the heavy sea and violent gales will be wanting.

In reply to his very curious calculation of distances for, and of coal consumption in, the Great Western, to reach the Havanna

by the way of New York!!! I beg to acquaint him that, in the event of the Great Western being ordered to the West Indies, she would go by the way of the trades. Also that upon a stowage of 600 tons of coal, or a few tons over or under, after steaming 3,250 nautical miles in 18 days and a half, the Great Western had fuel enough left to have steamed to the Havanna, or for 8 days' further consumption *at the same rate*; which, according to M. B.'s calculation, would have lasted one day beyond the seven required; so that, instead of waiting eight!! *to take in a supply of fuel*, she might have made the passage from Bristol to the Havanna, calling at New York, in the worst time of the year, in 25 days,—*versus* La Véloce's performance in 29 or 30 days with the assistance of the trades!!! and if we take 15 days and 19 hours (the average of her passages to New York), the assumed voyage would be reduced to 23 days!!! I leave the French officer for the present, and his "*faits incontestables que les ignorant ou les gens de mauvaise foi peuvent seuls les contester,*" to give you the information you desire.

On eleven passages, beginning on the 8th of April, 1838, from Bristol, and ending on the 27th February, at New York, the Great Western has been 165 days at sea. Up to that period she has been supplied with a little better than 5,000 tons of coal. When she has had Welsh coal on board, her consumption has for days together been as low as 23 tons per diem, while with Liverpool, Scotch of the east coast, and Pictou [N.S.], she has consumed from 35 to 40 tons, and doing less work. Allowing 10 cwt. per diem for cooking, cabin fires, forges, &c., &c., at sea *and in port*, and 5 per cent. for wastage, her average consumption with good, bad, and moderate, has been 28 tons per diem on 450-horse-power, something less than 6lbs. per horse-power per hour.

Of the 165 days at sea, the winds were against her $99\frac{1}{2}$, and favourable $65\frac{1}{2}$. Of the former she encountered 36 days of gales, three of which were terrific storms; and of the $65\frac{1}{2}$ days, only $11\frac{1}{2}$ were "variable weather and fine," or "inclinable to calm." Taking the distances she has run by the log, her average sailing has been $10\frac{1}{2}$ statute miles per hour. No vessel can have been less favoured than she has been by weather, as the foregoing will demonstrate; and from the vessels which have seen her on her last or present outward passage, buffeting against W.N.W. gales, it would appear she has been again out of luck, and that the easterly winds lately prevailing here, did not extend

beyond the outer edge of soundings. Of the 165 days at sea, she has experienced north and south *westerly* winds 119 days, and north and south *easterly* winds only 46 days, and those generally when homeward bound. The average of her outward passages has been 15 days 19 hours, and that of her passages homeward, 13 days and 6 hours, mooring to mooring. As far as I have been enabled to collect them, the averages of the sailing-vessels for the same period have been, outwards, 32 days 14 hours; homewards, 21 days 14 hours. On four or five occasions, some Liners (included) have been between $15\frac{1}{2}$ and 17 days only on their passage homeward, while others have been from 27 to 33; and outwards, I have nothing less than 24 days, and as many as 50 days. There is some difficulty in getting accurate returns upon this point, as many calculate from land to land, and are sometimes days getting into port afterwards; but I believe my statements would bear scrutinizing.

Yours, &c. &c.,

CHRIST. CLAXTON, R.N.

Great Western Steam-ship Office, April 19th, 1839.

On Atoms and Dimorphism. By HYDE CLARKE, Esq., C.E.

TO THE EDITOR OF THE RAILWAY MAGAZINE.

SIR,—In considering the combinations of atoms, I was naturally led to investigate the hexagonal formation; and I now present you with some of the results which presented themselves to me.

I took a hexagon x , and having drawn radii from the angles to the centre, I bisected the radii, and so produced an interior hexagon y . This produced an exterior ring of tetragonal figures, which I shall call and name hemihexagonsa, each of which is equal to dividing the hexagon into four equal parts. Such a dislocation being effected by the junction of the adjoining hemihexagons by their longest base, the mass of atoms would be diminished to a fourth of their size. This bisection of the radius we may suppose to go on an *ad infinitum*, and thus at every bisection the mass of atoms would be reduced to a quarter of their size. Bisecting the radius of the interior hexagon y , we then produce another range of these hemihexagons, which I shall call b . If a number of these hemihexagons b be arranged around the hexagon x , three on each side, they will form an hexagonal atom $\frac{1}{4}$ larger in radius, and $\frac{1}{8}$ larger in bulk; thus the atom which was 16 will become 25, or the square

of 5. If ten of the hemihexagons a be arranged around the hexagon x , they will produce an hexagonal atom $\frac{1}{2}$ larger in radius, and $1\frac{1}{4}$ larger in bulk; thus the atom which was 16 will become 36, or the square of six. If the hexagon x produced by the division of the hexagon y be divided, we have a range of hemihexagons c , which, if they be applied to the hexagon x , will increase its radius $\frac{1}{2}$, and its bulk $\frac{1}{2}$, or the atom from 32 will become 47. By a variation of these processes, an immense series of atomic numbers will be obtained, and a great diversity of atomic sizes.

Four hemihexagons will form a rhomb, and by redivisions, all the variety of trilinear and quadrilinear figures may be produced.

If we take a hexagon x and bisect its sides by radii, and unite these radii, we form an interior hexagon y , and according as we divide the radii, we have exterior irregular pentagons. If we bisect these pentagons, we have quadrilinear figures with two sets of equal sides, something like a diamond, each of which is equal to one-eighteenth of the whole. If two of these quadrilinear figures be placed with their largest sides together, they form an irregular hexagon, which being bisected, forms two trapezoids with one right angle, and two of these form a parallelogram, and one of them is equal to three small parallelograms.

I could carry out these divisions to a greater extent, but although I have only treated the hexagon as a superficies, I think that sufficient is shown to demonstrate the great susceptibility which this figure possesses of taking different shapes, and forming a great variety of equivalents. I had intended to apply this to some of the cases of dimorphism, but I think that I have done sufficient to show the manner in which the hexagon may divide in crystallization.

As I have already trespassed so much upon your space, I shall conclude by apologizing for laying so much before your readers which is old, although, I hope, with a new face.

Yours, &c.,

HYDE CLARKE.

Notices of Bills for the Session of 1840.

[Continued from our last, and containing those whose notices had not been completed when we went to press for No. 38. Those with a * have no titles in the notices.]

Central Kentish Railway.—New line; commencing from the Greenwich Railway at Deptford, and terminating at Deal; also to

make a deviation line, joining the main line at two points, and a branch to the South-Eastern Dover Railway.

* *Croydon Thames Branch Railway*.—To commence by a junction with the Croydon Railway at New Cross, Deptford, terminating near the banks of the Thames.

Great Western, Uxbridge, and Staines Junction Railway.—To commence near High-street, Uxbridge, terminating by a junction with the Great Western Railway at Iver, Buckingham, with a branch to near the banks of the Thames at Staines.

Hammersmith and Bermondsey Railway.—To commence near Counter's Bridge, Hammersmith, and to terminate at Grange-road, Bermondsey.

* *Hastings Railway*.—To commence by a junction with the South-Eastern Railway, near the parish of Smarden, to terminate near the Fish-market, Hastings; also to incorporate a company. New line.

Manchester and Leeds Railway.—To alter, amend, and enlarge powers of Act, to extend time limited for the purchase of lands; also to extend line to Hunt's Bank, to deviate line near the eastern bank of the river Calder, to terminate at Warmfield cum Heath, to divert part of the course of that river at Broad Reach.

Midland Grand Union Railway (Mr. Holme's line).—Commencing by a junction with the Midland Counties near King's Meadows, terminating at Teversal, in Nottinghamshire.

Milton and River Medway Railway.—Commencing near New Tavern Fort, Milton next Gravesend, and terminating near the banks of the river Medway, in the parish of Frindsbury.

* *Oxford Railway*.—Commencing at Oxford, and terminating at two several points with the Great Western Railway at Didcot, Berks.

South-Eastern Railway.—To alter and divert the line, and to form a junction with the Brighton Railway in the parish of Reigate, to extend time for the purchase of lands, and to enable the company to enter into contracts or agreements with the London and Brighton Railway Company; also to alter rates and tolls.

South-Eastern and Maidstone Railway.—Commencing from the South-Eastern Railway at Postern, Tunbridge, and terminating near Maidstone Lock, on the river Medway, Maidstone.

South-Eastern, Canterbury, Ramsgate, and Sandwich Railway.—To commence by a junction with the South-Eastern Railway at Ashford, and terminating at the Royal Harbour, Ramsgate, with branches to Sandwich and the Canterbury and Whitstable Railway.

Thames Haven Dock and Railway.—To continue, amend, and enlarge the powers and provisions of Act, to extend period limited for taking lands, houses, buildings, and other property, and for completing works; to make a branch from Orsett Fen, terminating near the Minorities; to alter, divert, and vary certain high-roads, rivers, and canals.

Westminster Bridge and Greenwich, Croydon, Brighton, and South-Eastern Junction Railway.—To commence near the foot of Westminster Bridge, and terminate by junctions with the Greenwich Railway at High-street, Deptford, and with the Croydon Railway near New Cross, Deptford.

On the Morecambe Bay and Shap Lines of Railway from Carlisle to Lancaster. By JOHN ROOKE, Esq., Author of "Geology as a Science," &c., &c., applied to Engineering.

EVER since the year 1834, the author of this communication has privately advocated a railway across Morecambe Bay, and turning the Cumberland group of mountains as the true way of connecting the counties of Lancashire and Cumberland by a railway communication. In 1836, Mr. Hyde Clarke first brought such a project before the public. Since then, a party in Cumberland has not only made the bright prospects to which Mr. Clarke's project had been brought—a gross political engine for party purposes, but have put forth a counter-project, sanctioned by the names of Messrs. Hague and Rastrick, which has rendered this great public work no better than a moon-struck vision. Do these engineers really believe that they can at a practicable expense, by force, stem a cross current from the entire Irish sea, and flowing directly from the deeps of the Atlantic Ocean, on a line of 13 miles in length? That which art and science might have safely overcome, defies the ruder efforts of force altogether. In truth, the plans of these engineers might form another Isle of Walney similar to the Plymouth Breakwater on an extended scale, and gain a port of refuge behind their works; but as concerns the construction of a railway across Morecambe Bay, the practical question is obviously set at rest for many years to come.

Now my humble agitation of railways in Cumberland, has always held the benefits of industry for my native county disinterestedly in view; and in following out this main object, I now find myself constrained to advocate, what I have hitherto opposed, a direct line of railway from Carlisle to Lancaster by Penrith and Kendal. But let the friends of this line advocate their project on practicable grounds, and they are sure to succeed. The locomotive engine does not apply on a line so elevated as the lowest summit of the Westmoreland mountain chain is. Up ascents of 53 feet a mile, a horse-power may travel at the rate of 16 miles an hour, granting that the carriages were light and adapted to

their purpose. Why this is equal to what is said to be the reduced speed of the London and Birmingham Railway. Now grant 12 miles an hour, and the speed is still a high one, and the power of horses on a railway what may be called a cheap rate. Indeed, whenever this question shall be handled in practical detail, as applied to a Railway from Carlisle to Lancaster, taking into account the cheapness of the propelling power, the lightness of the carriages—probably single to a single horse—the ascents and descents of the line, the cheapness of construction as compared to desperate tunneling, and the objections which may arise out of a limited amount of carriage horses, I feel, assured, may be found preferable to a locomotive power.

Nor does the question here put to issue assume a final shape. Might not a horse travelling along a moveable platform, similar to the platform of Heathcot's steam-plough, be made to propel both itself and a carriage at a high speed, whilst the horse itself travelled at a low one? As the horse would maintain its pull, and as the way would be continuous at the same time, I do not see aught required but common mechanical movements for effecting the purpose intended. Hence the carriages being light and single, would insure facilities of travelling equal to the best line of railway, if the terms here named be admitted. Even taking the converse of my proposition, still the ordinary view of a horse-power would ensure the success of the project previously given. Then a line of railway by Morecambe Bay may be allowed to take that same course which it is certain to do in time; and when the madness of attempting to turn the whole volume and force of the Irish Sea, on a line of 13 miles, is duly appreciated. What is the fury of the mad bulls of Bashan to this? Nothing. Yet, mad as is the fury of the Irish Sea driven onwards by the Atlantic Ocean, it may be effectually checked and secured by stratagem, even though it defy the rein put upon its muzzle by force. The topic is to me a familiar one, and I may be allowed to speak of it with freedom and confidence under all the circumstances of past and recent events. Messrs. Hague and Rastrick have not in Morecambe Bay a mere Dutch *dub* to deal with; but an oceanic tide-wave from the Atlantic.

Railway Gage and Gradients. By "J. B. W.," Civil Engineer.

TO THE EDITOR OF THE RAILWAY MAGAZINE.

SIR,—The searching inquiry into the comparative merits

of the "wide and narrow gages" which was challenged by the advocates of the new system, and in the progress of which the public were so efficiently assisted by your able elucidation of the various bearings of the question, has terminated in a recorded expression of public feeling in favour of the wide gage. This decision, inasmuch as it bore upon the more immediate and active prosecution of the works of the Great Western Railway, has advanced the interests of the promoters of that undertaking, by fixing their property upon a sound and durable basis. To the public at large, the investigation has been of incalculable benefit, by directing a more general attention towards the examination of the mechanical principles of railways, and convincing the most sanguine that those novel establishments had not at once attained to the acmé of perfection.

I do not wish to encroach upon your instructive pages, with the view to bring again before your readers topics with which they must now be well acquainted; but it does appear that some degree of misconception still prevails, among those who have not carefully studied the subject, as to a point intimately connected with this question—I mean the expediency of a reduction in the inclination of the gradients proportionate, if possible, or nearly so, to the reduction effected in the *sum* of the resistance, due to friction and the atmosphere.

It is not unfrequently said, "We grant that by extending the breadth of the bearings of the rails you secure the various advantages of diminution of friction on the axle and resistance on the rails (due to the increase of diameter of the wheels), that you place the centre of gravity considerably lower, and thereby add to the safety of passengers, that you diminish the lateral oscillations, and effect a saving in the wear and tear of engines and carriages, &c.; we grant all this, yet why, as in the case of the Great Western Railway, incur the additional expense of reducing the maximum inclination of 10 feet to a maximum of only 4 feet per mile?"

This corresponding mechanical improvement becomes necessary in order that the power of traction may be *diminished uniformly* throughout the line.

On a level plane, the work required from the engine to preserve the train at any required speed is equivalent to the sum of the resistances due to friction and the atmosphere. The latest experiments show, that with properly constructed carriages, and a road in good working order, the resistance from

friction averages 6lbs. to the ton; and, assuming a speed of 28 miles an hour with a total weight of 130 tons (a performance effected by the Northern Star engine), the resistance from the air may be estimated at 1lb. per ton * additional, giving for the sum of resistances to be overcome, 7lbs. to the ton, or $\frac{1}{170}$ th of the total weight of the engine and load.

On reaching an inclination of 10 feet per mile, or 1 in 528, the power necessary to neutralize the effect of gravity, in ascending, is $\frac{1}{528}$ th of the weight, and the work required from the engine becomes $\frac{1}{170} + \frac{1}{528} = \frac{1}{132}$ nearly, giving an increase in the ratio of 100 : 162, or of 62 per cent.

But let the gradient be reduced to an inclination of 4 feet per mile, or 1 in 1,320, the power of traction then becomes $\frac{1}{170} + \frac{1}{1320} = \frac{1}{1172}$, *i. e.*, it must be increased in the ratio of 100 : 125, or 25 per cent. Comparing this result with that obtained in the case of the gradient of 10 feet per mile, we find a mechanical advantage in favour of the lesser inclination of 37 per cent.

Further, in railway economy it is an universally admitted principle, that the power of the engine must be proportionate to the load, in other words, that the engine shall always, as nearly as practicable, act upon the maximum load it is capable of drawing. This principle involves a still greater reduction in favour of the improved gradient; for the weight of the engine and tender being constant on both inclinations, the comparison between the effects must be made with reference to the nett or useful load.

Pursuing the inquiry, therefore, with the data above cited, we have the entire load 130 tons, and the weight of the engine and tender 28·72 tons (the mean weight of the North Star engine as given in Mr. Wood's report, table A, or about 2·9ths of the whole. Consequently, in the ratio of 100 : 137, the 2·9ths of 100 must be deducted from both the terms, which reduces them respectively to 78 and 115, or which gives a proportion of 100 : 147 as the comparative useful effects of the same engine, moving at the same velocity up the inclinations of 10 feet and 4 feet per mile.

I have confined this investigation to the comparative merits of the two gradients of 4 feet and 10 feet per mile, because these belonged more particularly to the condition of the Great Western, which first called for the inquiry; but

* The atmospheric resistance depends on the quantity of exposed surface and the square of the velocity, and has nothing to do with the load.
—ED. R. M.

the difference becomes still more manifest as the gradients are increased, thereby increasing materially the cost of working lines constructed with gradients of 16 and 20 feet per mile.

I am, Sir,

Your obedient humble servant,

J. B. W.

Canals of the United States of America, Dec., 1838.

MAINE.—Cumberland and Oxford, extends from tide-water, near Portland, to Sebago Pond, 20½ miles long, 26 locks, and was completed in 1829. By means of a lock in Songo River the navigation goes to Long Pond, which makes a natural and artificial communication of 50 miles.

NEW HAMPSHIRE.—Several canals around the Falls of the Merrimack, 20 miles long, another canal (1837) in progress at Serrall's Falls, Concord.

VERMONT.—None.

MASSACHUSETTS.—Middlesex, between Boston and the Merrimack River, 27 miles long, 20 locks, 30 feet wide at top, 20 at bottom, and 3 deep, (1808). Blackstone, Worcester, and Providence (R.I.), 45 miles long, (1828). Hampshire and Hampden, 22 miles long, from Suffield in Count; to Northampton, forming a continuation to Farmington Canal; the whole length of the two, Newhaven to Northampton is 76 miles. Montague Canal, for passing the Falls in Montague, is 3 miles long, and South Hadley Canal around the Falls in S. Hadley is two miles long.

RHODE ISLAND.—Providence to Worcester, (see Mass.)

CONNECTICUT.—Farmington Canal, 54 miles, beginning at N. Haven, passing through the valley of Farmington River, and unites with the New Hampshire and Hampden. Enfield Canal, 5½ miles long around Enfield Falls, Connt. River.

NEW YORK.—Erie Canal—Albany to Buffalo, 363 miles long, 84 locks. Champlain Canal—Albany to Whitehall, 64 miles, 21 locks. Glenn's Falls—feeder, 12 miles, 13 locks. Oswego—Oswego to Syracuse, 38 miles, 14 locks. Cayuga and Seneca, Geneva to Montezuma, 21 miles, 11 locks. Chemung—Elmira to Seneca Lake, 23 miles; navigable feeder—Elmira to Painted-post (town laid out), 16 miles, 53 locks. Crooked Lake to Seneca Lake—8 ditto, 27 locks. Chenango—Utica to Binghampton, 97 miles; feeders, 16 miles, 109 locks. Genessee and Alleghany—107 miles; feeders, 15 miles, 132 locks. Black River Canal, from the Erie Canal at Rome to the foot of High Falls on Black River, 35 miles, 135 locks. Steam-boat Canal, from Lake Ontario to the River Hudson, beginning at Oswego, pass Utica, and thence along the Mohawk to the Hudson, 92½ miles. Ship Canal around Niagara Falls, 15 miles. Delaware and Hudson Canal, (finished) from Kingston on the Hudson River to Port Jervis on

the Delaware, 50 miles, thence up the Delaware to the mouth of the Lackawaxen River, 24 miles, thence in Pennsylvania to Honesdale, 26 miles; whole length, 109 miles. From the termination of the canal at Honesdale, a railroad, $16\frac{1}{2}$ miles long, with 5 inclined planes, surmounting an elevation of 800 feet, extends to the Coal Mines in Carbondale on the Lackawaxen River; the canal has 110 locks and 1,073 feet lockage. Harlaem Canal, from Hudson River to East River, near New York, 3 miles long, not done. Chittenango Canal, from Chittenango to Erie Canal, $1\frac{1}{2}$ miles long, 4 locks, done. Sodus Canal, from Seneca River to Great Sodus Bay on Lake Ontario, 25 miles long, doubtful. Scotsville Canal, from Scotsville to the Genessee River. Oneida Lake to the Erie Canal, $8\frac{1}{2}$ miles long, under contract in 1833. Owasco Lake to Auburn, 3 miles long. Erie Canal, at Rome, or Herkimer, to the St. Lawrence at Ogdensburg. Tunnel under the Hudson River at Albany, 24 feet wide, 12 feet high, 18 feet below bed of river.

State Canals finished	-	-	655
" commenced	-	-	168
			—823
Private Canals finished	-	-	122
" commenced	-	-	28
			—150
			—973 miles.
Railroads finished	-	-	218
" commenced	-	-	938
" authorized, chartered	-	-	1,704
			—2,860 miles.

3,833 miles

of internal improvement in the State of New York.

Capital of the above	-	-	74,000,000 dollars.
" for the extension, or rather the enlargement of the Erie Canal	-	-	15,000,000 "

89,000,000 "

Cost of railroads and canals in actual operation	-	-	19,500,000 "
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Cost of the canals, 14,500,000.—The tolls in 1836,	-	-	1,614,396 "
" 1837,	-	-	1,293,623 "

Income of the railroads not ascertained.

NEW JERSEY.—Delaware and Rariton Canal, from Bordentown to New Brunswick, 43 miles; navigable feeders from Bool's Island to Trenton, 24 miles, done. Morris Canal, from Jersey City opposite N. York to Easton, Pennsylvania, 101 miles, done. Salem Canal, from Salem Creek to the Delaware River, 4 miles, done. Battlehill and Montville Canal;—Wading River Canal, not begun.

PENNSYLVANIA.—Canals, made by the State, viz.: Pennsylva-

nia Canal, Delaware division; $59\frac{1}{2}$ miles. Central, or eastern and Juniata division, begins at Columbia, and follows the east bank of the Susquehanna River, intersecting the Union Canal at Middletown, passes by Harrisburg, at the head of Duncan's Island, crosses the Susquehanna, enters the valley of the Juniata, which it pursues to Holydaysburg; it has 33 aqueducts and 111 locks; 171 miles. Western division begins at Johnstown, traversing the valley of the Conemaugh, Keskiminitas and Alleghany Rivers, and terminates at Pittsburg; it has 64 locks, 16 aqueducts, 64 culverts, 152 bridges, and a remarkable tunnel 1,000 feet long; 105 miles. Susquehanna division, 39 miles; west branch ditto, $25\frac{1}{2}$ miles. north ditto, $55\frac{1}{2}$ miles; Wyoming ditto, 17 miles; Lycoming ditto, $41\frac{1}{2}$ miles; Beaver ditto, $30\frac{1}{2}$ miles. Franklin line ditto, $22\frac{1}{2}$ miles. French Creek ditto, $23\frac{1}{2}$; feeders, 11 miles. Total done, $601\frac{1}{2}$ miles. Beaver Canal, from the town of Beaver at the entrance of Beaver River into the Ohio at Newcastle, 25 miles. Mahoning and Beaver Canal, from Newcastle, Penn. to Akron on the Ohio Canal, is now in progress. The Pittsburg and Erie Canal, of which the Beaver Canal forms a section, is designed to connect the Penn. Canal at Pittsburg with Lake Erie, 73 miles. State extension Canals, north branch, 90 miles. Erle extension, 112 miles. Tangascontack, $7\frac{1}{2}$ miles.

Canals made by private companies, viz—Schuylkill Navigation Canal, 129 locks, 108 miles long; Union Canal, 91 locks, 80 miles; feeders, 24 miles; Lehigh Canal, 53 locks, $46\frac{1}{2}$ miles; Lackawaxen Canal, 37 locks, 25 miles; Conestoga, 9 locks, 18 miles; Cadorus, 9 locks, 11 miles. Total, $312\frac{1}{2}$ miles. Columbia and tide, 45 miles; Baldeagle, 25 miles; Manch Chunk and Wright's Creek, 26 miles.

Recapitulation of canals finished and in progress in this State, as well as the railroads.

Canals finished by the State,	600
“ in progress “	$209\frac{1}{2}$
	<hr/> 809 $\frac{1}{2}$
“ finished by companies	$286\frac{1}{2}$
“ in progress “	96
	<hr/> 382 $\frac{1}{2}$

Railroads finished by the State	120	1,191 miles of
“ in progress “	$41\frac{1}{2}$	[canal.
	<hr/> 161 $\frac{1}{2}$	
Railroads finished by companies	186	716 $\frac{1}{2}$ miles of
“ in progress “	$368\frac{1}{2}$	—railroad.
	<hr/> 554 $\frac{1}{2}$	
		1,907 $\frac{1}{2}$ miles of

internal improvement.

DELAWARE.—Chesapeake and Delaware Canal, from the head of Chesapeake Bay, partly in Delaware and partly in Maryland;

begins at Delaware City, 42 miles below Philadelphia; is 19 miles long. Done.

MARYLAND.—Chesapeake and Ohio Canal, begins at Georgetown, District of Columbia, on the Potomac, and goes to Harper's Ferry, thence to Cumberland, thence by Willis's Creek, Youghiogeny and Monongehela Rivers, to Pittsburg, 341 miles; is in operation as far as 135 miles. A tunnel must be made through the Alleghany mountains of 4 miles long.

VIRGINIA.—Dismal Swamp Canal; Lower Appomatox; James River Rappahanock, James River and Kenawha. Done.

NORTH CAROLINA.—Lake Drummond Canal, 5 miles long, North-west Canal, 6 miles long, and connects North-west River with Dismal Swamp; Dismal Swamp Canal, part in this State; Weldon Canal, 12 miles long. All these Canals are done.

SOUTH CAROLINA.—Santee Canal, Charleston to the Santee River, 22 miles long, done; 5 small canals to improve the navigation of the Catawba River, 11½ miles long; Saluda Canal, from head of Shoals to Granby Ferry, passing through the town of Columbia, 6 miles long; Dreher's Canal, to overcome a fall of 120 feet in the Saluda River, 1½ mile long; Lorick's Canal, on Broad River, 1 mile long; Lockhart's Canal, around the Shoals in Broad River, 2½ miles long.

GEORGIA.—Savannah and Ogeechee, 16 miles long. Done. An extension is proposed to Altamaha, 60 miles. Brunswick Canal, from tide-water on Altamaha River, 12 miles long. Done.

ALABAMA.—Triana, on the Tennessee, to Huntsville, 16 miles. Done. Florence to the bend of the Muscle Shoals, 37 miles, progress.

MISSISSIPPI.—None.

LOUISIANA.—La Fourche Canal, near New Orleans, to Berwick's Bay, 85 miles long, including natural navigation. Carondelet Canal, Miss. River to Lake Ponchartrain, 6 miles. Ship Canal (projected), to connect the Miss. River with the ocean; to begin near Fort Jackson.

TENNESSEE.—None.

KENTUCKY.—The Kentucky River navigation extends from its mouth up to the Three Forks. For the distance of about 250 miles, the whole will be slack water, adapted for steam-boats of 150 tons burthen; the locks will be 175 feet long, 38 feet wide, depth, 6 feet; the lift of the locks from 12 to 16 feet; the dams from 20 to 25 feet in height, and 400 to 500 in length, and about 70 feet at the base. The works of the lower part of the river have been put under contract (to be done in November, 1838). Locks of cut stone, and dams of timber cribs and stone, and will be the most splendid works of the kind in the Union. Improvement of Lecking River in a similar manner is contemplated, and of Green and Barren Rivers, of Cumberland River, Rockcastle and Sandy Rivers

OHIO.—This State in the year 1788 was a wilderness, and the tract of land on which Cincinnati now stands was sold for *forty-nine dollars*. It is now a handsome city of 50,000 inhabitants. The State in 1800 had 45,365 souls, and was admitted into the Union in 1802; in 1810 it had 230,760 do.; 1820, 581,434 do.; 1830, 937,903 do.; and when the census be taken next year (1840), it is supposed the State will number over a million and a half of souls. Canals:—Ohio and Miami Canals, which, with their branches, make more than 400 miles long, viz., the Ohio Canal extends from Portsmouth on the Ohio River to Cleveland, on Lake Erie, 307 miles long, and finished 1832; summit level is 305 feet above Lake Erie, 499 feet above the Ohio at Portsmouth, and 973 feet above the Atlantic Ocean. It has 152 locks, and 12,000 feet of lockage, and passes 13 towns. The several lateral branches or feeders are, from the main trunk to Zanesville, 14 miles; Columbus, 10 miles; and Lancaster, 9 miles. The Miami Canal, goes from Cincinnati to Dayton, 65 miles long, finished 1830; it has 32 locks and 296 feet lockage. An extension of this canal begun 1837, to be carried along the valley of the St. Mary and Au-glaize Rivers, and be united at Defiance with the Wabash and Erie Canal, which is nearly done. The whole distance in this line, from Cincinnati to Lake Erie, is 265 miles; the amount of tolls and water-rents received amounted in 1834 to 210,018 dollars; in 1835 to 232,894 dollars. Mahoning and Beaver Canal, 77 miles in Ohio, and 11 miles in Penn., already mentioned. Sandy Creek and Little Beaver Canal, from near the town of Bolivar on the Ohio Canal to the Ohio River, in progress; Chippeway to Clinton; Belleville to Bolivar; Franklin to New Lisbon, Cumberland County; Mount Vernon, Knox County, to junction of Mohican and Vernon Rivers; Lower Sandusky to the mouth of Tymochtee Creek; Cincinnati and Whitewater; Franklin and Delaware; Carrel Canal Company.

INDIANA.—491 miles canals and roads of the internal improvements of this state are under contract, or completed. Wabash and Erie Canal (see Ohio). Lawrenceburg and Indianapolis, part under contract. New Albany and Vincennes Turnpike with Central Canal, in progress. Central Canal is to diverge from a point on the Wabash and Erie Canal, between Fort Wayne and Logansport, passing the valleys of the Mississinnewa and White Rivers, down the west fork of the latter, passing by Indianapolis to the Ohio at Evansville, 290 miles long; the last 110 miles being common to the Erie and Wabash Canal: this canal is designed to open the central part of the state to both a northern and southern market. White Water Canal is to commence at the National Road in Wayne County, pass down the valley of the White Water River to Lawrenceburg, on the Ohio, 76 miles long. Lawrenceburg to Brookville is under contract. Terre Haute and Eel River Canal is intended to form a connexion between the Wabash

and Erie Canal, and the Central Canal, 40½ miles long. Michigan and Erie Canal or Railroad, to extend from the south end of Lake Michigan to the Wabash and Erie Canal, at or near Fort Wayne; it will complete the connexion between Lakes Erie and Michigan.

ILLINOIS.—Illinois and Michigan Canal, extending from Chicago, on Lake Michigan, to Ottawa, on the Illinois River, 95 miles was commenced in 1836, as a State work. It is to be 36 feet wide at bottom, 60 at the surface, and 6 deep; the Illinois is navigable at all seasons for steam-boats to Ottawa; within 36 miles of Chicago the canal must be cut 24 miles through solid rock from 7 to 28 feet in depth; the commissioners advertised in June, 1836, for 1,000 labourers, at 20 dollars to 30 dollars per month. Boardstown and Sangamon Canal.

MISSOURI.—None.

MICHIGAN.—Shiawassee and Grand River, done; to be continued to Clinton, on the St. Clair River. Ship Canal, connecting Lake Superior and Lake Huron at St. Mary's River.

DISTRICT OF COLUMBIA.—Branch of Chesapeake and Ohio, 1½ miles to Washington. Alexandria Canal, from termination of Chesapeake and Ohio Canal at Georgetown to Alexandria, 7½ miles. It is to be carried across the Potomac; all the piers nearly done.

Steam Navigation with India. By C. H. BAGOT, Esq.

TO THE EDITOR OF THE RAILWAY MAGAZINE.

SIR,—The question of a rapid communication with India, by the assistance of steam, has for a long period occupied the public mind, and until the supposed impossibility of effecting long voyages with that power was completely and for ever set at rest by the eminent success of the *Sirius* and *Great Western*, it is not surprising that the lines of mixed travelling by sea and land, through the Red Sea and the Euphrates, should have been most favoured. However, now that the run to New York, of 3,300 miles, has been repeatedly and successfully performed by different vessels, and at all seasons, it is rather remarkable that nothing decisive has yet been done towards establishing a communication by steam with India, by the Cape of Good Hope, where the longest run between any two stages need not exceed 2,400 miles.

There cannot, then, be any insuperable difficulty to accomplish the voyage; but it still remains to be ascertained how it can best be effected.

The superiority of very large vessels, in fact, the unfitness

of any other is such, that those of a larger class than any yet employed must be built. I should say nothing under 2,500 tons will be suitable; of course, their fittings, engines, &c., should be the most perfect and powerful that the ingenuity of man can effect.

I would suggest a vessel of that tonnage being fitted with three engines of 250-horse power each, the great breadth of the vessel would allow of their being placed abreast of each other, so arranged that two of them or all three could be worked at a time. In calms, or with favourable winds, two of them would be sufficient to maintain the required speed, and all three together would possess ample power to contend with any weather. One great advantage afforded by this arrangement in long voyages will be the facility for effecting any repairs to the unemployed engine; the same will be the case with the boilers, of which there will also be three.

Admitted, then, that the steam voyage to India can be performed, the next inquiry naturally is, how it can best be effected, and whether it offers an adequate prospect of remuneration for the very large capital that must necessarily be employed. As I have not seen any statements of these points I have made a few calculations that I hope will show, not only the facility and expedition with which the voyage can be made, but also the large profits that must be realized on the capital risked.

The distance from London to Calcutta is about 11,000 miles, with the following very suitable stages :—

	Miles.
Madeira	1,450
Ascension	2,430
Cape of Good Hope	2,140
Mauritius	2,200
Point de Galle	1,580
Calcutta	1,200
	<hr/>
	11,000.
	<hr/>

The first point I shall try to ascertain is the speed that may be calculated upon.

In a vessel of the size proposed, the diameter of the paddle-wheels will be about 35 feet, or the circumference 36 yards, and the mean velocity of the engine 15 strokes per minute; so that $36 \times 15 \times 60 = 32,400$ yards, or $18\frac{1}{4}$ miles the hour, for the velocity of the periphery of the paddle-wheels; but this must be diminished by one-fifth to reduce it to the

mean velocity of the wheels, giving $14\frac{1}{2}$ miles as the speed of the vessel when not opposed by strong winds; however, as strong contrary winds frequently will occur, it will be necessary to reduce it still farther. I will, therefore, take 13 miles per hour as the average rate in all weathers. At this rate 11,000 miles can be done in 35 days 6 hours.

Several methods have been followed for calculating the consumption of fuel in steamers. The *Sirius*, in her first trip to New York, used 431 tons of coal, and 43 barrels of resin, equal together to 452 tons of coal. This on her tonnage (700) was nearly 13 cwt. for each ton. The *Great Western* on the same trip consumed 450 tons of coal, which on her tonnage (1,340) was about $6\frac{1}{2}$ cwt. per ton, or little more than half of that used by the *Sirius*. Here is a remarkable proof of the superiority possessed by large vessels. I find by the simple rule of proportion, taking the tonnage of the two vessels and the consumption of the *Sirius* for the given numbers, that the consumption of the *Great Western* is found to be nearly the same as shown above. Thus,

Tons.	Cwts.	Tons.	Cwts.
1,340	: 13	: 700	: 679.

Now, by this process the consumption of the larger vessel for the longer voyage may be found:—

Tons.	Cwts.	Tons.	Cwts.
2,500	: 679	: 1,340	: 3,639,

the consumption of a vessel of 2,500 tons to New York. Again,

Miles.	Cwts.	Miles.	Cwts.
3,300	: 3,639	: 11,000	: 12.13,

the consumption of the vessel per ton on the voyage to Calcutta.

Tons.	Cwts.	Cwts.
Again, 2,500	$\times 12\frac{1}{2}$	$= 30,325 = 1,516$ tons,

the quantity of coal required for the entire voyage?

The more general method of calculating is by the consumption of coal per horse-power per hour, by which, as will be seen, nearly the same results are produced.

The proposed vessels are to have engines of 750-horse-power, but as they are not supposed to work up to that power, except occasionally, I shall take 650 as the mean average. The duty of the *Great Western* on her first trip was just 6 lbs. of coals per horse-power per hour; and although I believe that is a higher rate than she afterwards averaged, and much more than it is likely will be required on the eastward voyage, I will, nevertheless, take it for my present purpose. It will show the following result:—

H. P.	Lbs.	Hours.	Days.	Lbs.
650	$\times 6$	$\times 24$	$\times 36$	$= 3,369,600 = 1,504$ tons,

the consumption of the voyage.

The result of these calculations, then, is, that a vessel of 2,500 tons can make the voyage from London to Calcutta in 36 days (not including stops), with an expenditure of 1,510 tons of coal; however, to be on the safe side, I shall assume the time to be 40 days steaming, and 5 days stops, and the consumption to be 1,600 tons.

To build and completely fit out each vessel will require about 100,000*l*. She may easily afford ample accommodation for 300 passengers, and may besides carry 1,000 tons of measurement goods.

If the time consumed on each voyage is 45 days, and that she is 35 days in port at each end of it, she can make 5 runs, or two and half complete voyages in the year, I shall therefore calculate upon her doing so.

<i>Expense of Navigation.</i>					£.
1	Commander per annum	.	.	.	500
1	First mate.	.	.	.	250
1	Second mate	.	.	.	100
1	Third mate	.	.	.	80
1	Fourth mate	.	.	.	70
1	Boatawain.	.	.	.	50
1	Carpenter.	.	.	.	50
30	Seamen at 30 <i>l</i> . each	.	.	.	900
					<hr/>
37					£2,000
<hr/>					
1	Chief engineer	.	.	.	300
1	Second engineer	.	.	.	150
2	Third engineers at 100 <i>l</i>.	.	.	.	200
20	Fire-men at 40 <i>l</i>.	.	.	.	800
					<hr/>
24					1,450
<hr/>					
1	Head steward	.	.	.	100
3	Waiters at 40 <i>l</i>.	.	.	.	120
3	Under ditto at 20 <i>l</i>.	.	.	.	60
1	Head cook	.	.	.	100
2	Under cooks	.	.	.	80
2	Scullions	.	.	.	40
1	Female steward	.	.	.	40
3	Assistant ditto	.	.	.	60
					<hr/>
16					600
<hr/>					
					Total salaries
					£4,050
Provisions for 77 persons at 26 <i>l</i> . per annum each					2,002
					<hr/>
					£6,052

Coals for five trips at 1,600 tons for each trip=8000 tons at an average price of 4 <i>l.</i> per ton	£. 32,000
Tallow, oil, and small stores	500
Ten per cent. on first cost for repairs	10,000

Total expense of the year £48,552

INCOME.

<i>Voyage out.</i> —200 passengers the entire distance, at the average price of 100 <i>l.</i> each	20,000
Deduct 10 <i>s.</i> per head per diem on 45 days for table	4,500

Net profit on passengers £15,500

Carriage of 1,000 tons of goods at 5 <i>l.</i> ditto per ton	5,000
Total profit on voyage out	<u>£20,500</u>

<i>Voyage home.</i> —200 passengers the entire distance, at 130 <i>l.</i> per head average	26,000
Deduct table-money as above	4,500

Freight of 1000 tons of goods at 7 <i>l.</i> per ton	7,000
--	-------

Total profit on voyage home	£28,500
Ditto on voyage out as above	20,500

2)49,000

Mean profit of each trip	24,500
	5

Total for the year	122,500
Deduct the year's expenses	48,552

Net profit of the year £73,948

Nearly 74 per cent. on the capital expended upon the vessel.

It will be seen that I have not calculated on the one hand for the income derivable from the carriage of mails and parcels, and on the other, that I have omitted port charges, pilotage, &c. I had not any data by which to estimate either, so I have left them to balance each other.

The rate of payment by passengers is quite as low as that charged in sailing vessels, and there cannot be any doubt of the preference being given to steamers; upon the whole, if

these results are anything near the reality, and that they are I am sure will be admitted by persons acquainted with the subject, what a source of profitable speculation do they not present to the capitalist?

Ennis, Ireland, March 30, 1839.

[Our correspondent appears to have overlooked some able letters on the subject of steam navigation in our 34th and 36th Numbers, by Junius Smith, Esq., and a report on Indian Steam Navigation, by Mr. Holmes, C. E., in No. 35, a part only of which we have as yet been able to give.—ED.]

London and Birmingham Railway. By A FRIEND TO
RAILWAYS AND TRUTH.

TO THE EDITOR OF THE RAILWAY MAGAZINE.

SIR,—I beg to claim a few more lines in your journal, for a reply to an attempted counter-statement to my letter in your last number. In place of a refutation of my figures (which I understand have been closely examined and found unanswerable) respecting the lamentable situation of the above company, a sort of counter-statement has been cooked up in the "Railway Times." A few words will be enough to show that it is of a piece with the usual statements in that paper. The gross receipts for six months are taken at 288,000*l.*; the company's report, "Railway Magazine," No. 37, p. 40, shows them to be under 220,000*l.*, and by a notice in your last, p. 182, it would appear they were then but little more than 200,000*l.* The writer has therefore taken from 70,000*l.* to 80,000*l.* too much in the receipts. He has called the maintenance of the way 12,000*l.*; I have shown from the company's own figures, "Railway Magazine," p. 115, No. 38, it exceeds 43,000*l.* for the half-year, and whole line, or 31,000*l.* more than he has admitted. The company, per report, have received 4,978,000*l.* on capital account, from which take 2,373,000*l.* received on shares, leaves above 2,600,000*l.* on which interest is to be paid, which interest, at 5 per cent. per annum for the half-year, is 65,000*l.* or 5,000*l.* again more than the said writer assumes. There is also 7,000*l.* brought from a former account, and added to the half-year's profits, with which it has no concern. Including all these items, the writer in question has fraudulently swelled the half-year's profits by 70,000*l.* or 80,000*l.* + 31,000*l.* + 5,000*l.* + 7,000*l.* = 113,000*l.*, or 123,000*l.*, which taken from his magnificent 151,000*l.*, reduces it to the pitiful sum of 38,000*l.*, or 28,000*l.* (rather less than I had given), that is from 1*½* to 1*½* per cent. profit for the half-year

on 2,373,750*l.* paid up capital, instead of 6. Is another word, Sir, necessary to show the falsehood and fraud of the statement?

[The following communication on the cost of this line and its consequences, we received just as we were going to press. We give it a place as a sample of the public views on the subject.—ED.]

SIR,—I read with surprise in your last "Magazine," the letter of your correspondent, who signs himself a "Friend to Railways," wherein he gives a statement of the affairs of the Birmingham Railway Company by no means favourable to the shareholders of that undertaking. But when we look at the enormous outlay in its formation and completion, so far exceeding the estimate which first induced the public to become subscribers, there must have been either great want of judgment in the estimate of the engineer, or some extraordinary deviation from the original plan on the part of the directors, to incur such an immense excess of expenditure. Be it which it may, the shareholders and the public have great cause to complain, as they are taxed most unjustly for these mistakes,—the former in being deprived of a fair return of interest for the money they have advanced, and the latter by being charged a higher rate for travelling on the railroad than would have been required if it had been completed at or near to its original estimate.

This, Sir, is the more intolerable, as in your Magazine for December, 1836, and January, 1837, there is a report of a line of railway from London to Birmingham, made under the superintendence of Sir John Rennie, which it is stated by that gentleman, if I mistake not, can be completed for 1,200,000*l.* But taking it in round numbers at 2,000,000*l.*, it is only about one-third part the cost of the present line. Consequently, the public are charged nearly treble the price for conveyance that they would have to pay had that line been completed according to the original estimate.

I am, Sir, your most obedient servant,
April 20th, 1839. A FRIEND TO CONSISTENCY.

Wellesley Bridge, Limerick. By Messrs. JONES and LOMAX.

AT Limerick there are six bridges. Of these, the most important are Thomond Bridge and Wellesley Bridge. The former, crossing the river at King John's Castle, in the English town, to the suburb called Thomond Gate, on the

Clare side, was built in the year 1210, and with some alterations, formed the only means of communication between the ancient city and the county of Clare for many years.

It consisted of fourteen unequal arches, which were turned on wicker-work, the marks of which peculiar mode of construction were apparent on the cement. The roadway was level, but very narrow, and the general appearance of the bridge very much resembling that of Old London Bridge. This, as well as Baal Bridge—another ancient structure, now demolished, and which crossed the branch of the Shannon called the Abbey River—had houses on it, similar to London Bridge before the great fire in 1666. Old Thomond Bridge has been lately taken down, and replaced by a new and elegant erection, at a cost of twelve or thirteen thousand pounds.

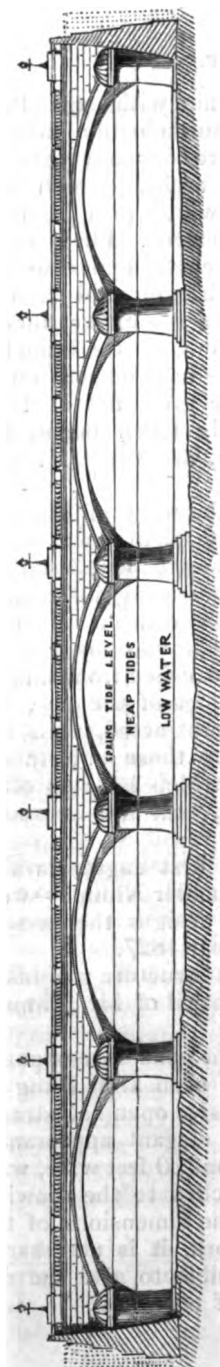
The great inconvenience caused by the want of a proper thoroughfare for the cattle and agricultural produce, which at certain seasons of the year were brought into the city in considerable quantities, and the daily increasing intercourse with the county of Clare, rendered the construction of a new bridge absolutely necessary. This was many years under consideration, and plans were furnished from time to time by the most eminent professional men of the day; but it was not till after a very long delay, protracted, as is but too frequently the case in Ireland, by those unfortunate political, religious, and local disputes which have so often defeated the most beneficial projects, that the necessary funds were obtained.

The splendid talents of one of the first engineers this country ever produced—the late Alexander Nimmo—were called into requisition, and from his designs the present Wellesley Bridge was erected, in the year 1827.

The annexed drawing of this elegant structure was taken on the spot by Mr. Jones, who, as a pupil of Mr. Nimmo, was engaged in the construction.

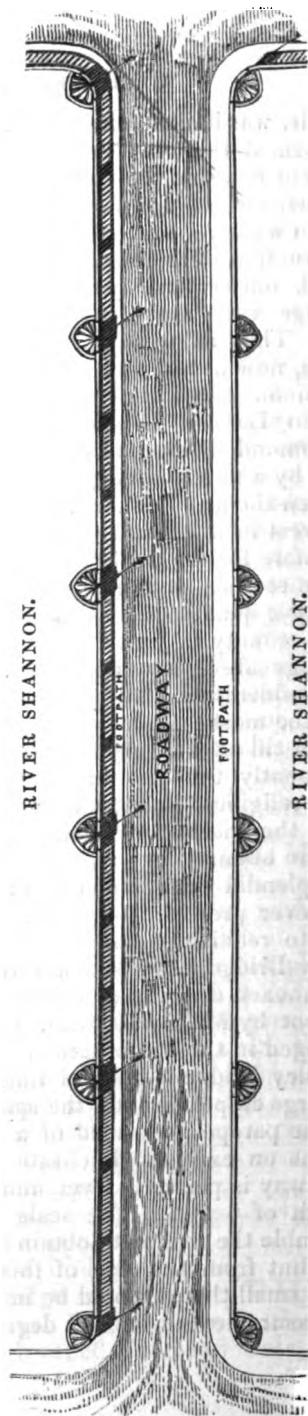
Wellesley Bridge is built of limestone, and is composed of five large elliptic arches, the span of each arch being 75 feet. The parapet is formed of a massive open balustrade, which has an exceedingly chaste and elegant appearance. The roadway is perfectly level, and about 30 feet wide, with a footpath of 6 feet. The scale attached to the drawing would enable the reader to obtain all the dimensions of the bridge; but from the size of this work, it is necessarily drawn so small that it would be impossible to give the detailed measurements with any degree of accuracy.

PLAN AND ELEVATION OF WELLESLEY BRIDGE, CITY OF LIMERICK. ELEVATION.



COUNTY OF CLARE.

COUNTY OF LIMERICK.



JOHN JONES, C.E., DELT.



This bridge forms the communication between New Town on the city side of the Shannon, and the northern or county of Clare side. Its approaches are over a succession of small arches used as vaults. On the Limerick side there is a swing bridge over a lock, through which vessels pass to the upper basin and quays ; and which connects it with the extensive docks now in progress of erection. The commissioners appointed by Act of Parliament in 1823, have power to apply the produce of certain taxes to the erection of docks, quays, &c., and having obtained from Government, on mortgage of various dues and tolls, an advance of 55,384*l.*, they have proceeded to carry into effect a design of Mr. Thomas Rhodes, who, in 1833, made elaborate surveys for the purpose of improving the harbour, and rendering it more secure and commodious for shipping.

By this plan it is proposed to construct a dam or weir across the river at Kelly's Quay, to convert the river above into floating docks. These are to be formed by excavating and levelling the bed of the river along the present quay walls ; and a new line of quays is to be built, on which warehouses may be erected. Slips or inclined planes and graving docks are to be built, and lines of embankments on each side of the river are to be formed, for the drainage of some considerable tracts of waste land, which may be rendered dry and profitable by the simple process of discharging the water through tide sluices in the embankments.

When these extensive improvements are fully carried into effect, and lines of railway formed, there is no reason to doubt, as we have before observed, that the city of Limerick will be one of the most flourishing in the United Kingdom.

J. and L.

Great Scotland-yard, April, 1839.

[We have been favoured with the above drawing and description by Messrs. Jones and Lomax, of Great Scotland-yard ; and we avail ourselves of the opportunity to mention the beautiful style in which engineering drawings of every description are got up in their offices. We conceive we are doing an essential service to the profession by making known that there exists an establishment where plans are prepared in a manner so superior, the more especially that these things are too often turned out in a very slovenly and inelegant condition.—ED. R. M.]

Question on Locomotives working on curved Planes.
By JOHN COKE, Esq.

TO THE EDITOR OF THE RAILWAY MAGAZINE.

SIR,—Having taken the Railway Magazine from its commencement, and presuming that you are willing to give any information in your power on its principal object, I take the liberty of requesting from you your opinion on the desired point in the following case. About 20 years ago, a railway was laid between Mansfield and Pinxton, where it joins the Cromford Canal. The railway is $7\frac{1}{2}$ miles in length, and is laid over a rising ground, the summit being nearer to Mansfield than Pinxton, in the proportion of $4\frac{1}{2}$ to $3\frac{1}{2}$, or thereabouts. The chief traffic upon it consists of coal taken from Pinxton to Mansfield, which of course ascends over the longest portion of the road, namely, from Pinxton to the summit. The steepest part of the road is 55 feet per mile, the most level near 49 feet per mile; besides this disadvantage there are some sharp curves. Hitherto all coals are taken up by horses, from conceiving that locomotive engines would not be available, having such an ascent as well as curves to contend with. As it is not possible to avoid curves altogether, the point on which I wish for information from you is, what is the sharpest curve on which an engine will act drawing a load of 10—15 or 20 tons, on an ascent such as that mentioned above. Three horses will draw about 10 tons in 3 waggon up the road. I am, Sir,

Your most obedient servant, JOHN COKE.

Debdale, near Mansfield, April 18th, 1839.

P.S. In your January Magazine, page 571, you mention (with incredulity) some extraordinary (alleged) performances of locomotives in America, has the account there stated been since corroborated? Curves are not mentioned?—[We believe not. If it has we have not seen it.]

[We publish the above interesting question in hopes it may elicit an answer from some of our scientific and practical readers. We have never ourselves given the amount of friction on curves a mathematical consideration. Many calculations on friction have been made, but we doubt whether any one of them would stand the test of experiment. We shall be glad, therefore, if the above question excite the talents of those who have leisure to examine the subject in all its bearings. Looking at it generally, we should much doubt whether a locomotive could be worked profitably up such an incline in which there were sharp curves. The traction on a perfectly straight plane would be about four times as great as on a

level; and it would therefore require all the power of an engine with coupled wheels to do any good. But if there were short curves, the strain and wear and tear would be so serious, and the loss of power so great, that we should be apprehensive no locomotive engine could work to good purpose; certainly we think not economically. However, we shall be happy to have the opinion of others, either practical or scientific men.]

REPORTS.

MANCHESTER AND LEEDS RAILWAY.

General Meeting held in Manchester, the 18th day of March, 1839;
JAMES WOOD, Esq. (Chairman of the Directors), in the Chair.

REPORT.—The Directors of the Manchester and Leeds Railway Company gladly avail themselves of the present opportunity for reporting to the Proprietors the progress of this great undertaking, as well as for putting them in possession of such additional information respecting the general circumstances and prospects of the company, as the lapse of another half-year may enable them.

As to the state of the contracts, which are now let throughout the line, the directors have the benefit of appealing to the engineer's report, which was presented to them last week, and an abstract of which is annexed. From this document it appears that the contracts, with two or three exceptions, are proceeding in a very satisfactory manner.

In reporting the state of the company's finances, the directors beg to congratulate the shareholders upon the very satisfactory manner in which the calls, which now amount to half the entire stock of the company, continue to be paid up, the actual amount remaining due upon them being less than $\frac{1}{4}$ per cent.

The directors take this opportunity of observing, that the whole of the sum called up has been already expended—that at some periods, the expenditure has considerably anticipated it, so that of 433,000*l.*, being the amount of the loans which they were authorized to take up by the Act of Parliament, 200,000*l.* have in addition been appropriated.

The directors have great pleasure likewise in stating, that not only has the entire amount of 433,000*l.* been contracted for, but that further loans are placed at their disposal, to meet any future sum which the company may have to borrow to complete their present undertaking; or to extend it according to the provisions of the Bill which is now pending in Parliament. They refer to this circumstance as indicative of the flattering opinion which the public entertain both of the soundness of the principle and productiveness of the returns of the Manchester and Leeds Railway. To prove the correctness of this view of the case, the directors think it their duty to acquaint the proprietary, that a committee has been engaged for some time in examining the various data by which the income arising from the expected traffic was originally calculated, as well as what may be fairly considered additional to it, and their report is very satisfactory, and confirms the opinion entertained by the directors, from the first projection of the railway, that the advantages which the proprietors are likely to derive from the investment of their property in the stock of the company will be very remunerative.

The purchases of the land required for the formation of the line of railway are now so nearly completed, that the directors can, with tolerable accuracy, report the result, which is more favourable than they anticipated would be the case when they presented their last half-year's report. The Parliamentary estimate for the land was 200,000*l.*; which sum is not exceeded by more than 50,000*l.* This is a conclusion of great consequence to the interests of the company, after the unprecedented difficulties and expenses to which they have been subjected by a vexatious and unrelenting opposition.

The contracts for the entire works have been let for the aggregate sum of 1,153,166*l.*; to secure the completion of which, the directors calculate it may be necessary to apply a further sum of 230,633*l.* for contingencies and extras, which is 20 per cent. upon the contract price. To this must be added 150,000*l.* for iron rails, and the same amount for Parliamentary expenses, engineering, management, salaries, interest on loans to the time of opening the line, &c. &c., making a total, for the formation of the entire railway, of 1,933,799*l.* The disposable capital of the company arising from 13,000 shares at 100*l.* each, and 433,000*l.* of loans, is 1,733,000*l.*; which leaves a balance required by the company to complete their present undertaking of 200,799*l.*

In addition to this statement, it will be remembered by many of the shareholders, that the amount of capital to be expended in the purchase of sites of land for stations, and the erections thereof, as well as in furnishing the company with locomotive engines, carriages, trucks, &c., &c., for carrying passengers and merchandisc, and which is estimated at 350,000*l.* (and which sum is now considered sufficient to include the working of the new lines, though not their formation,) would require an application to Parliament, for the purpose of obtaining the requisite powers. These sums are therefore both included in the new Bill before Parliament, which has passed the standing orders, and is fixed to go through the second reading on Tuesday, the 19th instant. The Bill for the Liverpool and Manchester Junction line having already been read a second time, the two companies will be prepared to go into committee together. It is obvious, therefore, that the new Bill possesses a two-fold character, and is required, first, to place the company in a position to accomplish the object of the present Act in all its designs, and likewise, secondly, to construct the additional lines, the nature of which have already been fully explained. An erroneous impression, however, having been received by some persons upon this subject, the directors think it desirable now to state, that the amount of capital required for these two objects is intended to be raised by the creation of 13,000 new shares of 50*l.* each, which cannot be issued until the Bill is obtained, as was stated to the special meeting of the proprietors, held on the 17th of January last.

In closing their observations upon this subject, the directors feel in duty bound to notice the remarks made upon their Junction Line at a meeting convened by the churchwardens of Manchester, in consequence of an apprehension entertained by them, that its formation would disturb the burial-ground connected with the workhouse of this town.

The directors consider it due to themselves to state, that they entertain as delicate a feeling about disturbing the ashes of the dead, *be they poor or rich*, as any of the gentlemen who took part in the proceedings of that meeting, or of the community in general; that, from the first projection of the Junction Line, their anxious endeavour has been to elicit the best information from every source within their reach, as to the precise points of demarcation between the ground in which interments have or have not taken

place; that the result of this investigation has determined them in marking out their line; and they have now the high satisfaction of being able to inform their friends, that the opinion which they entertained at the first is fully confirmed by subsequent inquiry, and that the formation of the Junction Line from the lodges above Ducie-bridge, past the workhouse, will not disturb a single interment.

With this statement as to the non-existence of any serious obstacle arising to the prosecution of their plans from the burial-ground belonging to the Manchester workhouse, the directors proceed with great pleasure to record their conviction, that it would be difficult adequately to state the immense advantages likely to arise to this company, and to the towns of Manchester and Salford, from a junction of the Manchester and Leeds Railway with that of the Liverpool and Manchester Railway Company, as well as the favourable character of the line now fixed upon in almost every point of view for securing this important object. It ought not to be overlooked, that the quantity of land required for the purpose is either not occupied or very partially so, or covered with property of comparatively little value,—that the portion immediately required for our stations, with a very small exception, is already secured to the company on very advantageous terms,—that the stations of the two great companies associated in this Junction are immediately contiguous to the centre of the town, and particularly convenient to the Exchange and the Post-office, the distance not exceeding 500 yards, and are admirably situated to promote the object for which the public money has been expended upon the great thoroughfares by which they are surrounded, and especially by the opening of the New Victoria Bridge, to secure to the borough of Salford a participation in the same benefits with that of Manchester. As to the line itself, in respect of its engineering properties, it will be sufficient to state, that their engineers have decided upon it, as the best which can be selected for the purposes of a junction.

In conclusion, the directors beg to observe, that they have proceeded to ballot for the retirement of three of their number, in compliance with the regulations of their Act, and that the parties retiring from the directory are the Hon. Capt. Thomas Best, R. N., Mr. Henry Forth, and Mr. Thomas Broadbent, who are eligible for re-election.

An abstract of the engineer's report, as well as a copy of the last half-year's accounts, is annexed.

Engineers' Report to the Directors of the Manchester and Leeds Railway.

Gentlemen,—Having received the following resolution passed at your board on the 11th February,—“That the engineers be requested immediately to prepare a report on the progress and present state of the works, with such general engineering observations relating thereto, as will enable the directors to give to the shareholders a correct and faithful account of the proceedings in this department, referring particularly to the portion of the line between Manchester and Littleborough, and stating as accurately as possible the time when the works on that part will be completed, as also when the engine-houses, and workshops, and watering-places, and offices, and conveniences, essential to the partial opening of the line in May next, will be ready,—such report to be laid before the board on or before the 11th day of March next, at the latest,”—We have carefully examined and fully considered the state and progress of the works, accompanied by the resident engineers over their particular districts. Previous to commencing the survey, Mr. R. Stephenson met us in Manchester; and we obtained his assistance in arranging the plans and sites, for the engine-houses, workshops, watering-places, and other offices connected with that department. We also

arranged the sites and plans for the requisite buildings for the passenger stations at Manchester, Rochdale, and Littleborough, for the opening of that portion of the line. The whole of the works, consisting of excavations, embankments, bridges, culverts, and the laying of the permanent way, are in such an advanced state between Manchester and Littleborough, that there can be no doubt of this portion of the line being ready for opening in the month of May next. The material in the excavations through which this portion of the line runs, is generally of so very favourable a nature, that the permanent road will be maintained at a very small cost, when compared with most other railways. The maintenance of permanent way is generally a very heavy item in the current expenses of railways, for some years after they are opened. The only place on this portion of the line where the material is bad is at Moston cutting, and the embankment at each end, where the material is clay, in which probably some slips may occur. More than one-half of the permanent road between Manchester and Littleborough is laid. The viaduct at Manchester is nearly completed, excepting that portion required for the stations, sidings, &c.; and it is now arranged to proceed, without delay, with the extension of the arches up to Lees-street, and to make provision for the arrival and departure of passengers. The whole quantity of earthwork between Manchester and Littleborough is 2,107,360 cubic yards, and out of this quantity there is executed 2,043,360, leaving only 64,000 cubic yards of earthwork to be executed. There are 54,972 cubic yards of masonry, out of which 50,898 are executed, leaving only 4,074 yards to be executed, excepting the masonry required for the stations. The whole of these works have proceeded in a rapid and satisfactory manner; the embankments are very high and numerous, some of them being 70 feet in height; but the material is of such excellent quality, there is not the slightest appearance of derangement, nor do we expect any will take place. We have the satisfaction of stating, that the large culverts under these heavy embankments, which required so much care to make safe, are all in a perfect state. The line will be finished to within 180 yards of the entrance to the Summit Tunnel, by May next; but as there is no suitable place for a station there, it will not be desirable to open it further than Littlebrough. The Roach Brook, which is taken over the railway near the tunnel entrance, can be made to answer the purpose of a watering-place for the engines. The tunnel at the summit of the country is not being proceeded with as rapidly as the contractors ought to do, and some change must be immediately made as regards the number of men employed, and the general management of the work. If a sufficient number of men be employed, there can be no difficulty in completing the tunnel in the year 1840.

The total length of driftway is 3,080 yards, of which, 1,840 is completed, leaving 1,240 to be executed. The completion of the driftway is of very great importance, not only by draining off the water, but it will give better admission of air. From the large size which it is being made, we shall be able, when it is finished, to commence tunnelling at a point intermediate between the shafts, and thus increase the number of faces for the tunnel. The present number of faces in operation is 24.

The Winterbut Lee contract, which is next to the tunnel, is going on satisfactorily. The Gauxholme viaduct, considering the difficulties encountered by the contractor in not obtaining possession of the land, is proceeding satisfactorily, and there is every reason to believe, that by ordinary exertion will be completed at the time specified. The Todmorden contract, owing to the same causes which impeded the Gauxholme viaduct, namely, not obtaining possession of the land in time, is in a backward state, and will require all the energy of the contractor, in order to enable him to complete his contract by

the time stipulated. Millwood contract is proceeding in a very satisfactory manner. The largest excavation originally contained 132,500 cubic yards, of which about 32,000 have been removed, leaving only 100,000 yards to be taken out, and the permanent way laid, in 16 months. The works on the Charlestown contract, although in a rather backward state, are of such a nature that there is no difficulty in completing them by the time stipulated, unless some unforeseen difficulties occur, which we do not, at present, contemplate. The Mytholmroyd contract, although only recently commenced, is proceeding in a satisfactory manner. The Luddenden contract is not proceeding quite so rapidly as could be wished, but as the material has to be carried to form embankments at each end of the excavation, there is no doubt of its being finished in the time. The Sowerby, Copley, Elland, and Rastrick contracts, are all proceeding very satisfactorily. From the steep and precipitous character of the ground, on the portion of the line extending from the summit tunnel to Rastrick, and the loose nature of some of the hills, slips may be expected to take place. These will, however, be confined to those hills which have the strata dipping towards the valley, or a thick covering of loose material, which has accumulated by falling down from a higher level. Cooper Bridge contract will require much watching. The contractor is a substantial man, but does not seem aware of the importance of proceeding with energy, and will require pushing. By due diligence the contract may easily be finished in time. The Mirfield contract is proceeding satisfactorily. The Thornhill contract is taken by the same party who has the Cooper Bridge contract, and here also he requires pushing, as the works are in a backward state. The Horbury contract is proceeding very satisfactorily, and there is no doubt the works, if persevered in, will be completed by the time specified. The Wakefield contract is also proceeding in a very satisfactory manner. The Kirkthorpe contract, as regards the embankment, is rapidly advancing. The other works on this contract cannot proceed more rapidly until the Act which is now before Parliament is obtained for making a diversion of the River Calder, which diversion will save the erection of two bridges, and will also straighten the navigation. If, however, this can be done in the early part of the summer, the contract may be completed in 1840, but not in the time specified by the contract, namely, April, 1840. This contract joins the North Midland Railway near Normanton. There is very little time remaining to complete the various stations, water-tanks, offices, engine sheds, &c., necessary for the opening of the line to Littleborough, and it will require every possible exertion to be made in order to get them all ready by the time the line is completed. However, there is little doubt they can be sufficiently prepared for opening the line.

We are, gentlemen, your most obedient servants,
GEO. STEPHENSON, THOS. L. GOOCH.

Manchester and Leeds Railway.—The Directors in account with the Shareholders, from 30th June, to 31st December, 1838.

1838.	Dr.		£.	s.	d.
June 30.	To total of receipts to this date,	£415,006	18	9	
	Less total disbursements, ditto	342,156	16	1	
		<hr/>			
		£72,850	2	8	
	Deduct so much of the calls paid in advance as have subsequently become due .	35,420	0	0	
		<hr/>			
1838.	To balance				37,430 2 8

	£.	s.	d.
Dec. 31. To amount received on account of calls . . .	259,680	0	0
“ To additional ditto of calls paid in advance . . .	31,275	0	0
“ To amount received on loan . . .	230,600	0	0
“ To ditto of interest received on delayed payment of calls . . .	342	16	1
“ To ditto of interest received from bankers . . .	1,445	2	1
	<u>£560,773</u>	<u>0</u>	<u>10</u>
<hr/>			
1838. <i>Cr.</i>			
Dec. 31. By further expenses connected with Acts of Parliament, Nos. 1, and 2 . . .	518	10	5
“ By surveying, and other preparatory expenses attending the Oldham and Halifax Branches and Junction Line . . .	1,114	2	9
“ By engineering . . .	6,447	7	11
“ By land and compensation, and attendant expenses . . .	94,575	17	4
“ By works . . .	208,069	16	8
“ By direction . . .	1,200	0	0
“ By travelling expenses . . .	64	3	6
“ By secretaries' and clerks' salaries, and office expenses . . .	535	9	5
“ By steam-engines, and other articles in stock . . .	5,577	11	8
“ By law charges for general business . . .	1,482	8	1
“ By advertising and printing . . .	427	17	6
“ By mortgage stamps, &c. . .	689	7	8
“ By interest on moneys paid in advance of calls . . .	1,268	6	8
“ By interest on loans . . .	1,402	6	1
	<u>£323,373</u>	<u>5</u>	<u>8</u>
“ By balance in bankers' hands this day . . .	237,399	15	2
	<u>£560,773</u>	<u>0</u>	<u>10</u>

Audited and found correct, J. H. STANWAY, *Public Accountant.*

TAFF VALE RAILWAY.

Half-yearly General Meeting, held 26th February, 1839.

REPORT.—The directors have the satisfaction of offering the proprietors the following report of their proceedings since the last general meeting.

The prompt manner in which the two last calls have been met by the proprietary, has placed the directors in a situation to advertise for the loan of one hundred thousand pounds, and they have great pleasure in stating that more than one-third of the loan has been already tendered for in the immediate neighbourhood.

The directors are fully impressed with the importance of urging on the completion of the railway; and in reference to the actual state of the works, they beg leave to call your attention to the following report of their engineer, Mr. Bush, in whom they continue to repose their fullest confidence:—

GENTLEMEN,—In compliance with your wishes, I have the pleasure to report upon the progress of the works, in order to acquaint you with their

present state. I should have desired a more favourable period of the year for this purpose, as the past season has unavoidably retarded our proceedings, not only from the inclemency of the weather, but from the shortness of the days. The several works being commenced in the order of their importance, I have, in conducting the contracts, endeavoured, as far as lay in my power, to urge the progress of those portions of the work requiring the longest period for their completion, or which, from their peculiar nature, were liable to accident and the delays consequent thereupon.

Commencing at Cardiff, I may briefly review the line as follows:—The works from Cardiff to Pentyrch are in a forward state; the greater portion of the earth-work and masonry being finished. The Melingriffith embankments are formed.—The bridge over the Taff river at Melingriffith is nearly completed, and within two months the whole of the arches will be turned. The bridges over the Taff, at Pentyrch, and at Taff's Well, are in a forward state, notwithstanding the constant and heavy floods which have occurred during the last four months. The portion of the line between these two bridges is nearly finished. The earth-work upon the Ynis Coy division is nearly done. At the Ynis Coy tunnel there remains only thirty yards in length to complete. The contracts from Ynis Coy to Newbridge are proceeding satisfactorily, and a very short period will complete the whole of the earth-work and masonry. The three arches of the bridge over the Rhondda river are turned, and I should, but for the weather, have been enabled to report to you that the centerings of the great arch were struck. Between the Rhondda and Clydach rivers, the work to be done is unimportant, and thence to the Cynon, the line is progressing as favourably as I can expect. Preparations are being made for the commencement of the bridge over the Clydach river. There remains one hundred and fifty yards in length of the tunnel at Godre Coed to finish, and the contractor has commenced driving from the northern end or face. The piers of the viaduct over the river and valley of the Taff, at Quaker's Yard, are nearly finished, and the centerings for three of the arches will be fixed immediately. The masonry and earth-work generally upon that portion of the line from Quaker's Yard to Merthyr, is going on as rapidly as I could wish. Nearly the whole of the Merthyr embankment is finished. The Rhondda branch line is in a forward state.—The earth-work and masonry are approaching towards completion. The bridge over the Rhondda river at Erw Isaf is commenced. Upon the Llancaich branch line, the inclined plane has been somewhat delayed the past month; but preparations are now made to carry on the earth-work with proper despatch. The bridge over the Taff at the same place will be immediately commenced. I regret to state that Contract No. 12 is stopped; but as there is only a small quantity of earth-work to complete, and two road-bridges to construct, measures will be adopted to finish this contract certainly within the specified period. I have judged it advisable to take prompt and active steps to expedite Contracts Nos. 1 and 14, and which subject I have already brought under the consideration of the board. With these exceptions, I have, under all the circumstances of our contracts, reason to be satisfied with the progress of the works generally; and as the period of the year has now arrived when the works can be pushed forward with increased activity, with the greatest advantage, I shall endeavour, to the best of my power, to carry out the instructions of the board in bringing the several contracts to a speedy, and, I trust, a successful completion.—I am, Gentlemen, your obedient servant,

GEORGE BUSH.

The only part of the main line not contracted for is between Crockherbtown and the Bute Ship Canal. Delays have arisen in the appointment of an umpire, which appear to be now nearly at an end; and the moment the company are possessed of the land, arrangements already made for commencing the works, will be immediately carried into execution.

The directors beg to subjoin a statement of their receipts and disbursements to 31st December, 1838.

WALTER COFFIN, *Chairman.*

Taff Vale Railway Statement, from 30th June to 31st December, 1838.

<i>Dr.</i>	£.	s.	d.
To balance as per statement last printed	18,718	0	2
To cash since received on arrears of calls	4,455	0	0
Ditto on call due 15th August, 1838	24,600	0	0
Ditto ditto 1st December, 1838	21,030	0	0
Ditto received in full of future calls on six shares	270	0	0
Ditto ditto in advance of ditto on five shares	50	0	0
To interest on bankers' balances and calls	269	13	1
To transfer fees	2	10	0
	£69,395	3	3

<i>Cr.</i>	£.	s.	d.	£.	s.	d.
By engineering department, superintendence of works, surveyors and draughtsmen's salaries to 30th June, 1838	1,080	12	7			
By labour, as per wages list	777	10	0			
By cost of materials, instruments, and incidental expenses	130	1	6			
	1,988	4	1			
Less cash paid on account, as per last statement	1,669	9	3			
				318	14	10

By engineering department, superintendence of works, surveyors', inspectors', and draughtsmen's salaries to 31st December, 1838, on account	1,142	10	11			
By engineers' salaries to 31st December, on account	200	0	0			
By secretary and clerk's ditto ditto	210	0	0			
By directors' fund to 30th June, 1838	250	0	0			
By payment for land and compensation, including valuing	11,396	5	5			
By cash paid on contracts for works	35,706	15	2			
By law charges, Parliamentary agents, &c.	68	4	0			
By advertising, printing, and stationery	137	18	9			
By office furniture, postage, and carriage of parcels, &c.	22	7	2			
By cash paid for transfer stamps	73	0	0			
By incidental expenses, engraving, office expenses, rent, rates, and taxes, hire of rooms, serving notices, and expenses of general meetings	162	5	9			
By balance	19,707	1	3			
	£69,395	3	3			

<i>Mem.</i>	£.	£.
Arrears of calls on 30th June, 1838	7,565	
Received as above	4,455	
		3,110

Call of 10 <i>l.</i> , due 15th August	30,000	
Received as above	24,600	
		5,400
Call of 10 <i>l.</i> , due 1st December	30,000	
Received as above	21,030	
		8,970
Arrears of calls on 31st December, as above	17,480	
Received since on account thereof	5,475	
Actual arrears due on calls 26th February, 1839	£12,005	

SHEFFIELD, ASHTON-UNDER-LYNE, AND MANCHESTER RAILWAY.

Half-yearly meeting, held at Manchester, on the 27th February, 1839;
 Lord WHARNCLIFFE, Chairman.

The directors of this undertaking have now the pleasure of laying before the shareholders a statement of their proceedings since their last Half-Yearly Meeting.

THE STAKING OUT OF THE LINE OF RAILWAY.—In a work of this magnitude it has appeared to the Directors of the utmost importance to weigh well their first steps, and, before committing themselves irretrievably to any particular course of operations, to ascertain whether its principles were sound and capable of practical development. On this account they ventured, in their last Report, to assert the advantage of allowing to their engineer sufficient time for staking out the line of the railway, as being one of the most important of his duties.

The Directors have been fully sensible that in a country possessing features of so varied a character, circumstances would present themselves requiring on their part the most mature deliberation, and where the consequences of a hasty or ill-considered conclusion would be productive of the most serious and irremediable injury. They also entertained a hope that by a careful and diligent examination of the line many of its difficulties would be lightened, if not altogether avoided. This hope, and their anticipation of advantage generally, have been fully realized, by the result of the course pursued. The railway is now staked out for the entire distance between Manchester and Sheffield, and the section now made exhibits a decrease of work which will considerably reduce the expenditure in formation, and at the same time secure the object most anxiously sought by the Directors, viz., a good, practicable, and safe working line.

PURCHASE OF LAND.—Whilst the survey has proceeded the Directors have been actively engaged in negotiations with the owners for the land required in the construction of the railway. Having set out upon the principle of exercising with moderation the extensive powers of coercion, with which they are invested by the Act of Parliament, they have hitherto in most of these negotiations been met in a friendly spirit, and have succeeded in contracting for the purchase of the greater portion of the land required at prices which must be considered extremely favourable. The nature of the country through which the line passes has hitherto precluded any heavy claims for severance; and the price of the purchases has therefore been in almost all cases the mere value of the land taken. In the immediate neighbourhood of Manchester and Sheffield a few such claims may arise, and in some instances the Directors will be compelled, in the due execution of their duty to the Company, to appeal to the decision of a jury. These claims, however, will be few, and none of them such as are likely to

exceed, by any considerable amount, their own estimate of value; and they are therefore able to predict, with some confidence, that the expenditure of the Company under this head will be not only less than that of any railway of similar magnitude, but even less than their own previous calculations led them to anticipate.

Whilst several negotiations for land are still pending, and some on the point of settlement, the Directors cannot enter much further into detail as to the exact progress made, or with propriety particularize the properties in the purchase of which difficulties have arisen. It may be sufficient perhaps to state, generally, that from the crossing of the Etherow at Saltersbrook to Broadbottom, the whole of the line, a distance of nine and a half miles, has been advantageously purchased from his Grace the Duke of Norfolk; and with the exception of a portion of the line in the township of Hattersley, the property of the Earl of Stamford, nearly the whole of the land from thence to the river Tame, at Dukinfield, has been agreed for at satisfactory prices. From thence through the townships of Audenshaw and Gorton, to Manchester, considerable progress has been made, including the purchase of ground for the formation of a station at the junction with the Manchester and Birmingham Railway, near Chancery-lane, Ardwick; and on the Yorkshire side a great portion of the land and houses through which the line enters Sheffield has been purchased or contracted for.

STATIONS AND STOPPING-PLACES.—It having been found necessary, whilst purchasing the land for the line of railway, to provide at the same time for station-room for carriages, wharfage, &c., the engineer was required to furnish to the Board his views as to the points of greatest public convenience, not only with regard to the traffic, but also to the working of the railway. The following was the unanimous conclusion of the Board, founded upon Mr. Vignoles' recommendation and their own personal inspection, viz., that the

First station be at the road from Guide Bridge to Hooley Hill.—This station will be about 1,500 yards from the centre of Ashton-under-Lyne, and within three-fourths of a mile of Hooley Hill, Denton, and Audenshaw, for which places it will form a convenient coal depot, being upon an excellent turnpike-road.

Second station, near the Peak Forest Canal, will accommodate the traffic of part of Ashton-under-Lyne, the whole of Dukinfield, and will be within a mile and a half of the most populous part of Stalybridge, and also upon an excellent road.

Third station, at Newton Green or Godley, will be a central point for Newton, Newton Moor, and Hyde, being within half-a-mile of each, and upon a good road.

Fourth station, at Broadbottom, will be the stopping-place for Mottram, Charlesworth, &c., and in the centre of a large manufacturing population.

Fifth station, at Dinting Vale, for Glossop, Hollingworth, &c.

Sixth station, at Hadfield, for Tintwistle, Padfield, Waterside, &c.

Seventh station, at the western entrance to the tunnel.

In addition to the above, for the western side of the summit, it has been already mentioned that the directors have secured land at the junction with the Manchester and Birmingham Railway for the necessary sidings for carriages and engines, and are in treaty for an additional quantity at the same place for any purposes of wharfage, &c., that may be required.

The exact location of the terminus in Manchester has not been finally determined, but the Company have already formed an arrangement by which they will be enabled to secure an eligible position near the station of the Manchester and Birmingham Railway, in the neighbourhood of Store-street.

The terminus at Sheffield will be at Clay Gardens in the nursery, where an ample quantity of land has been taken for warehouses, sidings for carriages,

&c., and all the requisite accommodations at or near the terminus of a line of railway.

The first station out of Sheffield will be at Parson Cross Bar, near the junction of the turnpike-roads leading to Ecclesfield and the adjoining villages and farms.

The second station at Oughtibridge, about a quarter of a mile from the turnpike-road, will accommodate the general traffic for Worrall, Greenside, Loxley, Bradfield, Brightomley, and the neighbouring villages.

The third station near Deep Car will be the depot for coke, coal, and stone, from Hunsheaf, Thurgoland, Bolsterstone, Midhope, and Wortley, and will be within thirty yards of the turnpike-road to Manchester, through Woodhead, and about a quarter of a mile from the road leading to Wortley.

The fourth station at Peniston will be of great importance, and will form the central point for Thurleston, Barnsley, Silkston, Hoyland, Swaine, Kirkburton, Oxspring, and the surrounding neighbourhood.

The fifth station will be at the eastern entrance to the summit tunnel at Dunford Bridge, where a large plot of land will be taken for engine-room and wharfage of coal, stone, &c.

Although the above-mentioned stations are the only ones which have hitherto suggested themselves to the Directors, they are desirous that the shareholders should understand that the actual sites have not been definitely fixed, and that it is very possible that upon further consideration some of these sites may be altered, and also more stations may be found necessary.

BRANCH COMMUNICATIONS.—Since the Directors had the pleasure of meeting the shareholders at the last Half-yearly Meeting, they have had their attention drawn to the different projects for forming communications with this railway. In every case they have been anxious to afford the utmost assistance which they could consistently offer; and in the case of the projected line from this railway to the Humber, they have thought it of sufficient importance to induce them to assist in procuring a survey of the country and the opinion of Mr. Locke, the Engineer of the Grand Junction and the London and Southampton Railways, upon its practicability. The result of this survey may be said to have been satisfactory to a certain extent; for although it has not yet led to the establishment of a company for effecting this communication, they feel that they have reasonable ground to anticipate the ultimate formation of such a line, upon the importance of which to the interests of this railway the Directors need not remark.

THE COMMENCEMENT OF OPERATIONS.—On proceeding to the execution of the works upon the line, it appeared to the Directors of importance that measures should in the first instance be taken to prepare for the vigorous prosecution of operations at the summit; and by the advice of their Engineer it was determined to commence at once the formation of a short length of road leading up to the western face of the tunnel near Saltersbrook. It was also, for the same object, considered desirable to commence the sinking of boreholes, in order to ascertain with certainty the nature of the strata through which that great work must be carried, and the existence of any natural difficulties which might have intervened to impede its formation.

The state of the works and his views generally, as to future operations, will be explained to you in a detailed Report by Mr. Vignoles, the Company's Engineer; in which Report, and the opinions and the statements which it contains, the Directors are happy in expressing their perfect concurrence and confidence.

RECEIPTS AND DISBURSEMENTS.—The accounts of the receipts and disbursements of the Company for the last half-year have been made up to the 31st December last, and will be laid before you by the Secretary, showing a net

balance, to the credit of the Company up to that date, amounting to 10,304*l.* 16*s.* 6*d.*

GENERAL REMARKS.—The Directors cannot conclude without expressing the increased confidence which they derive during the progress of the undertaking in its profitable nature as *an investment for capital*. As a main line connecting with each other the eastern and western seas, and bringing into the heart of the most populous district in Great Britain the produce of a rich agricultural district—opening out to a field of great mineral wealth—they have always been sanguine as to its success, even when viewed without reference to ulterior advantages to be derived from its connexion with other co-operating lines.

In all their calculations of revenue they have depended principally upon sources of traffic existing between the termini or in the country through which the line of railway passes. But as their attention is more constantly drawn to the subject in the course of their duties, they observe with much satisfaction the existence of other sources of remuneration which claim to be considered as parts, and not unimportant parts, of the undertaking.

So far as the experience of other railways has gone, it has been shown that the great increase of travelling has arisen not so much from the number of persons passing between the termini being greater, as from the accession of passengers from the adjacent districts falling into the line at different points, and contributing as feeders to swell the amount of the more regular traffic. On the Grand Junction and the London and Birmingham Railways this feature has been especially shown in the complete disarrangement of the old modes of communication even between towns at some distance from those lines, and the transfer of their road-traffic to the railways.

This beneficial result has been produced in level districts, possessing good turnpike-roads, and well provided with the means of conveyance; and it is not too much to anticipate the same result in a country where the roads and the means of conveyance are alike bad and insufficient.

The natural difficulties which the ridge of hills intersected by this line presents to railway communication, are of themselves sufficient to secure to it a monopoly of all the traffic between the west and the large districts south-east of Sheffield to the Humber, and to constitute it a *main trunk*, to which the country for a considerable distance on each side must be tributary, either by the formation of branch railways, or by other means of communication.

WHARNCLIFFE, *Chairman*.

To the Directors of the Sheffield and Manchester Railway.

Gentlemen,—Since my last General Report to you, the final determination of the central line of the Railway has been made, after a most detailed examination and study of the ground. It was the business of my full and efficient staff, during many months, to collect and arrange the numerous transverse sections and surface levels, to enable me to decide the precise course to be followed, and no trouble or investigation has been spared in this respect. The result has been a material economy in the working section, without any practical deterioration of the original plans, and the more I go into the calculation of the expense of the construction, the more I am confirmed in the opinion I have always held out to you, that this Railway will be most satisfactorily completed for your present capital. This opinion, to which I stand pledged, and from which I have never shrunk, I must draw upon your kind confidence to entertain upon my assurance, until the drawings of every work of art upon the line are made out, which will be in the course of the month of May, when I shall be able to prepare specifications and estimates in sufficient detail to enable me to speak with still greater certainty on this head.

The plans for treating with the landowners having been furnished to the

committees and solicitors at Manchester and Sheffield as fast as completed, my attention was drawn to the three great points on our line to be overcome, viz., the passage over the river Mersey, or Etherow, at Broadbottom, the crossing of Dinting Vale, near Glossop, and the summit tunnel. Of the two first I am already satisfied they will be well overcome by an expenditure within my Parliamentary estimates, and in a few weeks I will submit the models, drawings, and details. Of the tunnel, the operations for the opening of the western face, the results of the boring as far as it has gone, and further careful examination of the dip of the strata, and of the bassetings along, and in the vicinity of the line, fully confirm my original conception, and satisfy me that the material in the tunnel will be hard throughout, and that the whole may be satisfactorily and economically worked. The time is now arrived when the drift-way from the western-end, and the working-shafts, should forthwith be commenced, and the boring be resumed, as soon as accommodation can be provided for the workmen, by the erection of cottages, shops, &c., a want of which has greatly retarded, during the late severe weather, the advancement of the first works above Woodhead; but which being now remedied, and a plentiful supply of rails and other materials being on the ground, the contractors are pushing vigorously on with as large a force as can be advantageously employed. We should calculate on each of the working-shafts along the tunnel occupying a year to sink: all the shafts may be put in working at the same time, and it will entirely depend on the number concluded on to sink as to the period in which the tunnel may be completed. On this, as well as on the size and mode of working the shafts, and also the tunnel, I shall shortly be prepared to give you a detailed report. It may be sufficient to state here generally, that with ordinary exertions, the summit tunnel may be completed and opened in less than three years.

The very first operations for the present season will be to let by contract the aqueduct for the Stockport canal at Gorton, and the earthwork from Audenshaw to Manchester; the next to be got out are the works through Audenshaw to the river Tame, near Ashton; and, in succession, the operations through Dukinfield, Newton, Godley, Hattersley, and Broadbottom, to the river Etherow or Mersey—the viaduct there, and the heavy cutting on the Derbyshire side at Gamesley, between the Etherow and Dinting Vale:—all these works ought to be contracted for, and in operation before Midsummer, so as to have two full seasons for work, and, if desirable, may, with proper exertion, be brought into profitable operation by the end of next year—at all events, without any great pushing, in the spring of 1841.

Between Dinting Vale and the west-end of the tunnel, I would recommend that the several small cuttings and fittings be let simultaneously: these would soon be completed, and would make the railway an available service road, to bring down to the intended viaduct at Dinting Vale a supply of materials, which will, without doubt, be found in or adjacent to the cuttings, and of which an inexhaustible supply exists close within reach. There are no parts of this division, including the viaduct, which may not be finished in eighteen months from the time of breaking ground; and the same may be stated of the whole of the line of railway from the east-end of the tunnel to Sheffield. In fact, such are the facilities, and so well may the operations be divided and efficient force put on to advantage in every place, that if the funds are regularly supplied, the line may be completed and put to work in the spring of 1842.

Should you concur in these plans, it may be proper, so soon as the land purchases are completed, to authorize me to make arrangements for organizing the mode of superintending the work; and in the meantime I will make every effort to push on the working-drawings and specifications.

I am not aware of any further point I have to observe upon at this time, and repeating my assurance of the time and cost within which the railway may be finished, I have the honour to be, gentlemen, your very obedient servant,
Dinting Vale, February 23, 1839. CHARLES VIGNOLES, *Engineer.*

General Abstract of Expenditure of the Company to 31st December, 1838.

RECEIPTS.		£.	s.	d.
To amount received from shareholders up to 30th June, 1838		30,876	11	11
Amount received on account of first deposit on shares, from 30th June to 31st December		4,610	0	0
Amount received on account of first call, due 10th January, 1839, up to 31st December, 1838		807	10	0
Amount of calls received in advance, up to 31st December, 1838		624	3	2½
Balance of interest allowed by bankers		309	8	1½
		<hr/> £37,227 13 3		
DISBURSEMENTS.				
By Disbursements up to 30th June, 1838		19,097	0	1
Expenses of direction, including deputations, travelling, and amount voted by shareholders, at last meeting		2,011	11	8
Office expenses, including salaries, stationery, office furniture, rent, postages, &c.		1,049	0	4½
Law expenses		180	0	0
Land and compensation		1,497	0	0
Calls on shareholders on account of proprietors of land		907	10	0
Engineering expenses and works		2,141	0	5
Advertising expenses		139	14	2
Balance to credit of Company, 31st December		10,304	16	6½
		<hr/> £37,227 13 3		

Moved by Mr. Samuel Seed; seconded by Mr. William Thomson; and carried unanimously;

"That the Report of the Directors, and that of the Engineer, be received and circulated amongst the shareholders."

Moved by Mr. David Waddington; seconded by Rev. R. Bassnett; and carried unanimously;

"That the accounts now produced be passed and confirmed, and published with the Report."

Moved by Mr. John Turner; seconded by Mr. John Chapman; and carried;

"That the four retiring Directors, viz., Mr. Thomas Ellison, Mr. George Sidebottom, Mr. Joe Sidebottom, and Mr. Charles Appleby, be re-elected."

Moved by the Rev. R. Bassnett; seconded by the Rev. W. Whitelegg; and carried unanimously;

"That the best thanks of the Proprietors be given to the Directors for their assiduous attention to the interests of the Company."

(Signed)

WHARNCLIFFE, *Chairman.*

Moved by Mr. M. Ellison; seconded by Mr. G. Sidebottom; and carried unanimously;

"That the cordial thanks of the Meeting be given to Lord Wharncliffe, not only for his able conduct in the chair upon this occasion, but also for the zeal and attention with which his Lordship has supported the interests of the Company, in the capacity of Chairman of the Board of Directors."

SCIENTIFIC AND MISCELLANEOUS INTELLIGENCE.

Steam Navigation.—Dr. Cadett has addressed a letter to the "Colonial Gazette," in which he urges the propriety of making the Azores an intermediate station between this country and America and the West Indies, and advises to make St. Thomas a sort of general rendezvous for passengers and letters for the West India islands, the Gulf of Mexico, and South America. This is, probably, very good and feasible; but when the Doctor talks of opening in this way a communication with Australia, across the Pacific, we confess we cannot see how it is to be done. The distance between the nearest point of Australia and Panama (which we suppose is meant to be the point of crossing America) is about 8,000 miles, which would be rather more than could be conveniently performed in one uninterrupted voyage.

British Queen.—Every effort is making by the directors to start the British Queen for New York on the 1st of June.

Phosphorescence by Elevation of Temperature.—It has long been known that shells exposed to the light and afterwards carried into darkness, shine for some time, and after they had ceased to shine, that their luminosity is restored by an elevation of temperature. M. Becquerel, in some late experiments, has shown that the phosphorescence likewise ceases sooner if they are transferred from the light into a dark and colder place. When calcined oyster shells, the one at the ordinary and the other at a freezing temperature, were exposed for a short time to the solar light, and then carried into darkness, they maintained an equal brilliance for a quarter of an hour. When they had become obscure the one in a capsule at the freezing temperature, taken out and put in a capsule at the ordinary temperature, became again phosphorescent for a short time, but soon grew obscure. On elevating the temperature, the luminosity soon returned. Shells newly calcined, thrown on a shovel of 212° Fahr. or 392° Fahr., exposed to the sun and quickly taken into darkness, shine for a brief period; but if the shovel had been first raised to a red heat there was no phosphorescence. Hence it appears that temperature exercises great influence on phosphorescence, and that the lower the temperature the more excitable bodies are, when carried afterwards into light.

Composition and Decomposition of Water.—M. Grove has succeeded, by a very simple experiment, to decompose water by platina wires, in communication with a voltaic pile, which we believe has never before been done. He takes two tubes of glass, closed at one end, and about half filled, the one with oxygen and the other with hydrogen, and having passed a platina wire into each, plunges the tubes into water slightly acidulated. He then brings the wire in the oxygen tube into contact with the zinc plate of a voltaic pair, and the other with the copper plate. Shortly, the water rises in both tubes, but twice as high in the hydrogen as in the oxygen tube. Here, says M. Grove, is both the formation and decomposition of water, two actions here depending one on the other.

Effects of Electrical Discharges, through Wires of a Small Diameter.—Nairne remarked, that powerful discharges of electric batteries through small iron or silver wires, when they were long enough to become red, only contracted the length of the wires without diminishing their weight. M. Becquerel repeated the experiment on a platina wire of 0.072 millimetres diameter, and observed the same effect. But the most curious part of it is, that he has determined the law of the contractions, and found that the diminutions

per cent. of length are reciprocally proportional to the cubes of the diameters of the wires, the electric discharges being of course equal.

Curious Clock.—Two French gentlemen, MM. Christa and Mejanardi, have submitted to the Academy of Sciences a machine which tells the hour, day of the week, day of the month, month, year, cycles of the sun and moon, dominical letter, epact, Easter day, and phases of the moon.

Spots of the Sun.—An Italian astronomer, named Capocci, says, that while he was looking at a large spot in the sun, in January last, of the size of the earth, it suddenly contracted to the size of Europe.

Westminster Sewage.—At the meeting of the Institution of Civil Engineers on the 23d inst., the president in the chair, a very beautiful map of the city of Westminster, laid down on a scale of 200 feet to an inch, was presented by Mr. Jones, of Great Scotland-yard. It was accompanied by a large book, containing enlarged sections and details, and the necessary descriptive explanations; the whole forming a complete representation of the sewage of Westminster to the present time. It will be in the recollection of many of our readers, that the council of the institution selected this interesting subject for a prize essay, and we think none could be found more worthy the attention of a body of scientific men than one so vitally affecting the comfort and prosperity of a large city. The information connected with the sewage of the metropolis was scattered in various quarters, and Mr. Jones has done good service to those who may follow in his steps, by collecting and arranging these materials. In introducing the papers to the meeting, the president made some very complimentary remarks on the author, and said, that whatever might be the fate of them as regarded the prize, there could be but one opinion on the unwearied industry and pains exhibited by Mr. Jones in the preparation of them.

Exploding Gunpowder by the Voltaic Battery.—Colonel Pasley, R.E., has made several successful subaqueous and subterraneous experiments at Chatham, in firing gunpowder by the means of this battery, at the distance of 170 yards. The conducting wires were nearly the whole distance either under ground or water. Large stones, prepared on purpose, and let down 14 feet under water, were blasted in the Medway by this apparatus, some charges having been under water for a few days previous to the explosion. The conducting wires were secured to a rope with hemp yarn sewed round them, the rope previously being well saturated with boiling tar, to prevent the joints of the conducting wires from separating by the contraction and expansion of the rope when either wet or dry. It was found difficult to attach the wires in such a manner as to avoid breaking the small platinum wire enclosed in the charge. It was also found that the force of the battery considerably depended on the distances of the object and the thickness of the wires used in the experiments. Conducting wires of small diameter, used for a given distance, were found to require a much more powerful battery to ignite the charge than those of greater diameter.

INSTITUTION OF CIVIL ENGINEERS.

May 15, 1838.—JOSHUA FIELD, V.P., in the chair.

The following were elected: John Hague, a member; Thomas Turner, a graduate; and Lieut. Frome, R.E., an associate.

Thames Tunnel.—Mr. Brunel stated, that they were at present more inconvenienced by fire than by water. Some of the gases which issue forth ignite very rapidly; and the reports from Guy's Hospital stated some of the

men to be so injured by breathing these gases, that small hopes were entertained of their recovery. The explosions are frequent, and put out the candles of the workmen; but the largeness of the space prevents their being dangerous. The thickness of made ground above them is about 18 feet. He conceives that these deleterious gases issue from the mud of the river; they proceed from a corner at the top. They had used chloride of lime, but without any great success; there appeared no remedy for the inconvenience. The breathing the gas produces sickness.

Explosion of Steam-boilers.—A communication was read from Mr. Timperley, of Hull, on the explosion of the boiler of the Union steam-packet at that place last summer. This was attributed to the water in the boiler having become so far reduced as to lay bare the tops of the flues, which would probably be heated to a very high temperature. Water coming in contact with them in this state, on a slight lateral motion of the vessel, steam of sufficient intensity to produce the effects described might be produced.

Mr. Macneill stated, that the boiler plates had in the above instance been rent across like a sheet of paper. There was not a single rivet broken.

A long discussion took place on the causes to which these extraordinary cases could be referred; the violence of the explosion on bursting appearing greater than could be referred simply to the pressure of the steam. If the water were supposed to be decomposed by contact with the hot plates, some of the oxygen would be absorbed by the metal, and the proportion requisite for an explosive mixture destroyed. But there were great difficulties in conceiving the decomposition of water by the plates of a boiler. The commission of the Franklin Institute concluded this to be impossible.*

It appeared, then, that there were grounds for doubting the fact of the presence of oxygen, such as would cause an explosion. And it seemed almost unnecessary to resort to any such explanation, as the sudden generation of steam of high elasticity would produce a pressure sufficient to blow out or rend the boiler in the weakest part before the pressure could be transmitted through the steam to the safety-valve. The transmission of pressure through an elastic fluid, requires time, but the action on the solid is instantaneous.

Steam Expansion Table. By George Edwards, M. Inst. C. E.—A paper by Mr. Edwards was read, descriptive of the principle and method employed in dividing his steam expansion table, an account of which had been laid before the institution last session.

May 22, 1838.—The PRESIDENT in the chair.

Bursting of Steam Boilers.—The minutes of conversation on the explosion of steam-boilers having been read, considerable doubts were expressed as to the probability of the formation of an explosion under the circumstances in the interior of a boiler. It was suggested whether a large portion of hot surface might not become suddenly exposed by the cracking off of the incrustation on the sides of the boiler. The metal expands more rapidly than the incrustation; portions of the latter may crack off and expose a large extent of hot surface to the steam and water; a sudden increase in the elastic force of the steam would necessarily ensue. The incrustation is itself a bad conductor of heat.

Mr. Field, in reply to a question respecting the rapid decay of the bottoms of copper boilers, stated, that copper is very rapidly injured by repeated heatings, and will not long bear high degrees of temperature.

* See Report of Franklin Institute on the Explosion of Steam-boilers.

Mr. Cubitt stated that he had not known of any case of explosion of a boiler containing plenty of water. With respect to a recent accident in America, which had taken place soon after the boat had started, he thought that a boiler was more likely to be short of water at starting than at any other time, for the steam will probably have been blowing off for some time, and the men neglected to supply the boiler; whereas after the vessel has started, the pumps worked by the engine supply the boiler. He should think that a boiler is more likely to be short of water before or just after starting, than at any other time.

Mr. Field stated that the vessel had stopped, and the explosion took place while taking up a passenger; the safety-valve had been held down. In all these cases of explosion the difficulty which he experienced was, how to account for the pressure being suddenly increased by the amount which must be supposed. It did not appear to him sufficient to suppose that water flowed over hot flues. If the whole of the top of the fire-place were red hot this could not produce the effect. The steam-boilers in America are generally of a form ill adapted to resist pressure.

Mr. Buddle stated that the only clearly ascertained fact seemed to be that these explosions took place when the boilers are dry. He had a case of twin boilers, standing side by side; the dry one exploded; no cause could possibly be assigned but that it was dry. The steam communication betwixt the boilers was free, by a pipe *eight* inches diameter. It was not a collapse, but the boiler was torn into a thousand pieces. There are two distinct cases; the one a rent or bursting, the other an explosion, in which the parts are thrown to a considerable distance.

Mr. Cubitt called attention to the remarkable case mentioned by Mr. Buddle of two boilers connected together by a steam-pipe of eight inches diameter, the communication free betwixt them, but one short of water; the other having its proper quantity of water. The dry boiler blew up with a great explosion, the other remaining uninjured. The steam was blowing off at the time. With respect to the nature of the report, Mr. Buddle stated that he had not himself heard it, but it was represented as sudden and short; any representation of this nature cannot be depended on, as two persons situated in different positions will give very different accounts. This had occurred to his knowledge on the explosion of a coal-mine. He was close by and thrown down; the report was smart like that of a six-pounder; at two miles off it was like a peal of thunder, shaking the houses and throwing down the furniture. One peculiar feature in the explosion of the steam-boilers is the rending and crumpling up of the boiler-plates. The plates are rent and twisted as if of paper.

History and Construction of Westminster Bridge, accompanied with detailed Drawings. By F. Whishaw, M. Inst. C. E.—This account of Westminster Bridge has been extracted from the very voluminous documents in the Westminster Bridge Office, access to which was given to the author of this paper by the kindness of Mr. Swinburne, the resident engineer to the bridge.

The first Act was passed in 1736, and empowered certain commissioners to raise moneys by lottery. Three sites were pitched upon; the Horse-ferry, over against the Palace-yard, and over against the Woolstaple, which latter was finally fixed on. The scheme was violently opposed by the City of London and the Thames watermen. The commissioners selected a very curious and well-designed wooden superstructure, by James King, but having determined that the bridge should be of stone, they accepted a proposal from Mr. Labelye to found one pier by means of caissons, and which he had offered to build at his own expense.

This bridge, so lasting a monument to the genius of Labelye, consists

of fifteen semicircular arches, decreasing regularly in span by 4 feet from the centre, which measures 76 feet, to the sixth arch on each side, which is 52 feet in span; all the arches spring from the line of low water of 1736. The whole distance between the abutments is 1,068 feet, with 870 feet clear water-way, and 198 feet solid. A peculiar feature in this bridge is, that the spandrels are formed of radiated purbeck blocks with occasional bond stones, and the interior filled with ballast and rubbish.

The design of Mr. Labelye was the only one for laying the foundations of the piers under water, and the application of caissons for this purpose then first took place. The construction of these caissons and method of founding the piers by means thereof are fully described and illustrated. The piles were driven by an engine invented by Mr. Valoue, a watch-maker; it was erected on a platform, fixed on the top of a barge, and worked by three horses walking round and turning an upright shaft, on which was fixed a large cog-wheel and a drum, on which the rope was wound, and passing by pulleys to the top of the guide frames was connected with a follower furnished with tongs, as in the common pile engine. The number of strokes in an hour was about 150, at an elevation of 9 feet; the weight of the ram 1,700lbs. The piles were generally cut off; the time occupied in cutting off a pile about 15 inches square and 10 feet under water being not more than a minute and a-half. The construction of the abutments and of the arches is fully described, and the quantity of stone employed in the middle 76-foot arch, and the two adjoining 72-foot, is stated; the expense of these three arches was 24,074*l*.

The centres employed were on the principle of the diagonal truss; for the five middle arches three rows of piles were driven on each side to support the centres, and for the other arches only two rows. Each centre consisted of five ribs of fir timber, resting on transverse and longitudinal oaken plates. The five centres used on the Westminster side were afterwards used for the corresponding arches on the Surrey side; the striking of the centres was first performed by means of circular wedges of a peculiar construction; this mode, however, from its expense, was superseded by straight wedges.

A most interesting portion of the history is that which relates to the 15-feet sunken pier. There was no piling under the caisson bottoms, and the removal of gravel of the bed of the river very near the pier in question occasioned consequently a sinking. The progress and nature of the sinking are accurately detailed. The south point had settled 14 inches and the north point 13 inches; and the sinking still going on, it was determined to remove the superstructure above the sunken pier and damaged arches; the sinking still continued, but at last appeared to stop, and the whole amount was found to be 3 feet 4 inches at the north-west angle, and 2 feet 7 inches at the south-east angle of the pier. Centres were erected under the two damaged arches; the adoption of which plan was recommended to the commissioners in the following words:—"If the pier should settle much more it is not in the power of any mortal agent or agents to hinder the arches from following it, as long as it is possible; and therefore, in that case, the two arches instead of parting asunder, and their materials falling into the river, and not to be taken up without a great expense of time and money, will be received and their materials supported and secured, in order to their being regularly rebuilt." The pier, however, lightened as above described, did not continue to sink, and the weight over the piers was considerably reduced by introducing segment arches over the 15-foot pier, and half arches over the adjoining piers, leaving a considerable void space beneath each.

Labelye presented to the commissioners several reports on the open joints, on the sunken pier, on the Surrey New-road, and on the completion of the works. These are most interesting, serving, as they do, to exhibit the state of engineering at that time in the country.

A detailed account is also given of the ingenious wooden superstructure designed by Mr. James King, and of Mr. Batty Langley's design for a wooden bridge at the Horse-ferry. The author has also collected, at immense pains, the prices of materials and of labour as paid in the erection of Westminster bridge; he has also compiled a journal of works from the commencement of the undertaking to the time the bridge was opened. These most interesting and instructive documents are collected from the voluminous records deposited in the Bridge Office.

The paper is accompanied by an atlas of eleven drawings, showing the site and all the details of the bridge, with fac-simile signatures of Charles Labelye, the engineer, and Messrs. Jelfe and Tufnell, the contractors.

May 29, 1838.—The PRESIDENT in the chair.

James Routh and B. Townshend were elected graduates; and F. Braithwaite, J. Milner, N. King, J. Richards, P. Henderson, were elected associates.

Decomposition of Water.—The minutes of the conversation on the explosion of steam-boilers were read, and Mr. Lowe stated, that the ordinary process of making water gas showed that an iron plate would readily decompose steam or water. The decomposition of water goes on extremely well until the oxidation of the tube has advanced to at least 3-16ths of an inch. An iron tube begins to make gas extremely fast at first, and continues until the tube is cased with a thick crust of protoxide of iron.

Thames Tunnel.—The drawings of the Shield at the tunnel were exhibited, and Mr. Brunel explained the construction of the shield, and the manner in which it is advanced and worked.

June 12, 1838.—The PRESIDENT in the chair.

Captain Robe, R.E., and James Thomson, were elected associates.

Improved Levelling Staff.—Mr. Bruff exhibited an improved form of levelling staff. The figures on this staff are inverted, so that when viewed by an inverting telescope in the usual manner, they appear erect, and are read off without any danger of mistake; which may readily occur when some figures, as for instance 6 and 9, are read off inverted. The mechanical arrangements for extending it are with the view of securing greater steadiness. The principal improvement consists in there being attached to the bottom an universal joint, fixed to an iron plate; this plate remaining fixed, the necessary errors consequent on moving the staff for reversing its face, when the last forward station is to become the next back, are avoided.

It was suggested that the universal joint would be attended with great advantages in sloping ground; in general, however, the tripod invented by Mr. Simms was sufficiently convenient.

Mr. Bald suggested that the universal joint would be extremely serviceable if placed on something solid. It was his practice to drive a wooden plug into the ground, on which the staff was set; these plugs were left in, and serviceable for verifying the observations. He had levelled through a distance of forty miles, leaving a plug at every station.

Description and Drawing of the Ice Boat. By S. Ballard, A. Inst. C.E. —The principle of breaking ice adopted by Mr. Ballard, as explained in a communication made last session,* consists in forcing the ice upwards instead of forcing through it horizontally, or by pressing it down. For this purpose

* See "Minutes of Proceedings," Jan. 31, 1837.

a frame, coated with sheet iron, is laid over the front of a boat, with an inclination downward from the boat, the lower end being under the ice. The paper describes the construction of the boat by reference to a detailed drawing and section.

Experiments on the Flow of Water through Pipes of different Lengths.
By W. A. Provis, M. Inst. C. E.—In this paper are recorded *two hundred and eight* experiments on the flow of water through leaden pipes of $1\frac{1}{2}$ inch diameter, of lengths 100, 80, 60, and 40 feet, and for heads of water of 35, 30, 24, 18, 12, and 6 inches. The arrangement of the experiments is described with great accuracy, and the results of the experiments are given in twelve tables, showing the length and inclination of the pipe, the head of water at the upper end of the pipe, the time from turning the water into the upper end of the pipe to its reaching the lower end, the time of filling the receiver, the discharge in cubic feet per minute, and the mean discharge per minute. To each set of experiments is appended a column of remarks, in which the state of the pipe as to dryness, and the quantity of water in the discharging end, are recorded; these circumstances having considerable influence on the quantity of the discharge.

The experiments are tabulated in a different form, showing the effect of a given head of water in pipes of different lengths and inclinations. The following important results are deduced. In level pipes the quantity of water discharged is nearly in the inverse ratio of the square root of the length; but the departure from this rule is greatest in the shortest lengths and greatest heads. In inclined pipes, the increased discharge is greater in the long than the short pipes. The increased discharge for an increased head is nearly in the same proportion through the long and short lengths.

June 19, 1838.—The PRESIDENT in the chair.
Table of Gradients. By C. Bourns, A. Inst. C. E.

per chain.				per chain.			
1 ft. pr. mile = 1 in 5280	=	·16 of an in.		31 ft. pr. mile = 1 in 170·3	=	4·65 of an in.	
2	"	"	2640 = ·30	32	"	"	165·0 = 4·80
3	"	"	1760 = ·45	33	"	"	160·0 = 4·95
4	"	"	1320 = ·60	34	"	"	155·3 = 5·10
5	"	"	1056 = ·75	35	"	"	150·8 = 5·25
6	"	"	880 = ·90	36	"	"	146·6 = 5·40
7	"	"	754·2 = 1·05	37	"	"	142·7 = 5·55
8	"	"	660·0 = 1·20	38	"	"	138·9 = 5·70
9	"	"	586·6 = 1·35	39	"	"	135·4 = 5·85
10	"	"	528·0 = 1·50	40	"	"	132·0 = 6·00
11	"	"	480·0 = 1·65	41	"	"	128·8 = 6·15
12	"	"	440·0 = 1·80	42	"	"	125·7 = 6·30
13	"	"	406·1 = 1·95	43	"	"	122·8 = 6·45
14	"	"	377·1 = 2·10	44	"	"	120·0 = 6·60
15	"	"	352·0 = 2·25	45	"	"	117·3 = 6·75
16	"	"	330·0 = 2·40	46	"	"	114·8 = 6·90
17	"	"	310·6 = 2·55	47	"	"	112·3 = 7·05
18	"	"	293·3 = 2·70	48	"	"	110·0 = 7·20
19	"	"	277·9 = 2·85	49	"	"	107·0 = 7·35
20	"	"	264·0 = 3·00	50	"	"	105·6 = 7·50
21	"	"	251·4 = 3·15	51	"	"	103·5 = 7·65
22	"	"	240·0 = 3·30	52	"	"	101·5 = 7·80
23	"	"	229·5 = 3·45	53	"	"	99·6 = 7·95
24	"	"	220·0 = 3·60	54	"	"	97·8 = 8·10
25	"	"	211·2 = 3·75	55	"	"	96·0 = 8·25
26	"	"	203·1 = 3·90	56	"	"	94·3 = 8·40
27	"	"	195·5 = 4·05	57	"	"	92·6 = 8·55
28	"	"	188·6 = 4·20	58	"	"	91·0 = 8·70
29	"	"	182·1 = 4·35	59	"	"	89·5 = 8·85
30	"	"	176·0 = 4·50	60	"	"	88·0 = 9·00

On the Construction of Roads on deep Bogs and Moss. By W. Bald. —In this paper the author gives a detailed account of the construction of roads through bogs, and of the methods of securing the foundations of small bridges in boggy places; also some suggestions on the formation of railways on deep moss.

The general principles are as follow. The first operation after laying out the line of road is to drain thoroughly the bog over which it is to pass. For this purpose main drains and counter drains parallel to the line of road are to be cut with a regular discharging fall along the bottom. Transverse drains must also be cut betwixt the main and the counter drains, so as effectually to drain off all the surface water and stagnant pools. The cutting of these drains must be carried on gradually, and by degrees; if the bog be moist, the operations, which can only be carried on at dry seasons of the year, will probably have to be continued over three or four years before the drains become permanently fixed at the required dimensions. The counter drains are essential, as they relieve the pressure on the sides of the main drain, and consequently prevent it filling up. The bog stuff cut out is to be dried, and when the bog under the line of road has become sufficiently dry, the road is to be levelled, and made of proper shape, and the cross drains are to be filled with dry turf.

The road-way is then to be floored or trunked over with five courses of dry heathy sods, which are to be well rolled with a heavy cylinder. Upon this trunking is to be laid a soling, consisting of a mixed mass of prepared earth and gravel, of about six inches in thickness, and the whole to be coated with good clean gravel. The road metal is then to be laid on, in two successive coats, each of about three inches in thickness, the first being well consolidated before the second is laid on.

The great points to be aimed at are perfect drainage and good trunking, as, if these are not attained, roads constructed on bog will lose their shape, become ruinous, and soon go to decay.

[Size of hammers] :—The author considers the form and size of hammers employed in breaking hard stones.

These are frequently too heavy; a hammer weighing about a pound and a quarter, of an elliptical form, pointed at the ends, the area of end being about one hundredth part of a square inch, appears to be best suited for ordinary purposes.

[Turf Fuel] :—The turf of bog, being carbonized, makes excellent fuel, and may be employed in the manufacture of iron, and such iron is extremely malleable. Turf fuel is also used most extensively in working the steam-engine in many districts of Ireland; it is used on board the Dunally steam-boat, for engines of eighteen-horse power, and the expense is 4d. per mile.

June 26, 1838.—The PRESIDENT in the chair.

Sir John F. W. Herschel, Dr. Faraday, and J. G. Children, Esq., were elected honorary members.

Hardening Iron.—A discussion took place on the effect of turf fuel on iron, and on the methods and principles of hardening iron.

Tubing Locomotive Boilers.—A communication was read from Mr. Buck on the relation betwixt the diameter and intermediate spaces of the tubes in a locomotive boiler, for the production of an unanimous effect in the generation of steam.

REVIEW OF BOOKS.

London and Birmingham Railway. By Thos. Roscoe, Esq., and Peter Lecount, Esq., 8vo. Tilt, London; and Wrightson and Webb, Birmingham. —We gave our meed of approbation to this work while it was in the course of publication in numbers, and we like it much better now it is completed, and entire in one volume. The early part of the work is devoted to the history of the line and the works, and is interspersed with some amusing anecdotes of the difficulties encountered in making the preliminary surveys, and the means employed to get over them. On one occasion, "Mr. Gooch was taking levels through some of the large tracts of grazing land a few miles from London, two brothers occupying the land came to him in a great rage, and insisted on his leaving their property immediately." Now, had Mr. Gooch done this, all the preceding labour, it seems, would have been useless. It was therefore of the utmost consequence he should complete his levels. Having learnt from these worthies that a neighbouring field was not theirs, he walked off through a gap in the hedge thither, and selected the highest spot of ground he could. When "Mr. Gooch commenced looking through his telescope at the staff held by his assistant, the grazier nearest him, spreading out the tails of his coat, tried to place himself between the staff and telescope, in order to interrupt all vision, and at the same time commenced shouting violently to his comrade, desiring him to make haste and knock down the staff." Not being able to hear very well what was said, he asked the man at the staff what his brother meant. "Oh," replied the man, "he is calling to you to run to stop that horse which is galloping out of the fold-yard." Away went clodpole as fast as he could run, and Mr. Gooch in the meanwhile very quietly took the sight required, for, by being on higher ground than the other grazier, he looked over his head. In another instance, a Rev. Gentleman who was alarmingly hostile to the whole concern, had his lands surveyed while he was preaching to his flock; and just when the clergyman had concluded his sermon, the sinners had finished their survey and walked off.

The authors speak in strong terms of the exactions to which the company have been exposed in the purchase of their land, and the shuffling expedients that have been had recourse to for the purpose of plundering it.

"In one portion of the line, some land was passed through in such a way that it was evident the proprietor required, in reality, no accommodation in the way of bridges at all. At the first outset, however, he demanded five bridges; but in the course of the discussion came down to four, with an equivalent in the price of the land. It was absolutely necessary to obtain the land, and the agreement was signed, sealed, and delivered, guaranteeing to the proprietor a bridge at A, another at B, another at C, and another at D. Soon after the money had been received, the proprietor wrote to say, he thought he could dispense with the bridge at A, and if the company would give him about half its value, he would do without it." "As this would save expense, it was agreed to." In a short time he found he could also do without the bridge B, and compounded for it on the same terms as before. This he successfully did afterwards with the bridges C and D, thereby giving the most decisive proofs that there never had been any necessity for any of the bridges, and that the proprietor's sole object was to get "a few cool hundreds."

But if landowners preyed upon the company, it appears the company's servants sometimes returned the kindness upon others, though in a somewhat smaller way, as the following anecdote will show:—"A navigator engaged on one of the contracts, went into a village public-house, and made the

inquiry—"Have you got any gin?" laying a great stress on the word *you*. The landlord quickly responded that he had plenty. "Oh," said the navigator, "I am glad of that! I have been to the other public-house, and broke him of all he had. I wanted two gallons, and he had only got one; so I have had to come here for the other one." The gallon was quickly measured out, and added to that which he had before in his bottle. He was then very coolly walking out of the shop: mine host, however, soon reminded him that there was a little process to go through which appeared to have escaped his recollection, namely, the paying for the gin. To this the 'Navie' shrugged up his shoulders, and said he would pay on Saturday night. Boniface thought he would not be cheated in this way, and the gallon measure was quickly refilled again out of the 'Navie's' bottle, when he departed, looking very indignant at not being trusted till his pay-night. It only remains to say, that what he had originally in the bottle was a gallon of water—not a gallon of gin,—and consequently his ingenuity was rewarded by his getting clear off with half-a-gallon of 'mine host's best cream of the valley,' in a state conveniently prepared for drinking."

With many such lively anecdotes is the interest of the reader pinned to the book, and without any sacrifice of the more serious details of this stupendous line. The information respecting the works is, of course, from the best possible authority, as Lieut. Lecount has been in the company's employ from the beginning. A few of the sums expended on the various portions may serve to show the vast expense of this undertaking. The station near Wolverton, and works connected with it—that is, a locomotive engine-station for repairing the engines, and accommodation for the passengers who there take refreshments, are contemplated to have cost 100,000*l.*; the Wolverton viaduct, 660 feet long, the top of whose parapet wall is 57 feet from the level of the ground, cost 28,964*l.*; the Kilsby tunnel, 2,423 yards long, perhaps the most formidable work on the line, owing to the quicksands and water which beset the excavators, cost "above 300,000*l.*," or more than 130*l.* per yard run!

During the progress of a work of this extent, and over so great a variety of country, it is natural that many difficulties would have to be encountered which would exercise the wit and ingenuity of the engineer. The Wolverton embankment was one which gave considerable trouble. After overcoming slip upon slip, it at length actually set on fire. "There was a portion," say the authors, "of alum shale in it, which contained sulphuret of iron; this becoming decomposed, spontaneous combustion ensued, and one fine morning there was the novel sight of a fifty-feet embankment on fire, sleepers and all, to the great surprise of the beholders. The inhabitants of the neighbouring villages turned out, of course, in no small amazement, and various were the contending opinions as to the why and the wherefore. Some said, 'the company were hard up for cash, and were going to melt some of the rails;' others, 'that it was a visitation of Providence, like the Tower of Babel.' At last one village Solon settled the point, 'Dang it,' said he, 'they can't make this here railway arter all; and they've set it o' fire to cheat their creditors.'"

The great difficulty in the Kilsby tunnel was a basin of quicksand and water, extending 450 yards in length, and dipping about 6 feet below the arch, which in the preliminary borings had accidentally not been touched. It took nine months to pump the water out with engines, so as to render the sand sufficiently dry for working, "during a considerable portion of which time the water pumped out was 2,000 gallons a minute." The largest shaft in the tunnel is described as being 132 feet deep, 60 feet

diameter, and the walls of it 3 feet thick. A million of bricks were used in it, and thirty millions in the whole tunnel and shafts. The authors compute that these bricks, if laid end to end, would reach 4,260 miles, and the weight of the whole tunnel would freight 400 ordinary merchant ships of 300 tons each. From the extracts we have made our readers will perceive that this book is written in an animated and attractive style. An excellent map, by Cheffins, of the line and country, and several wood-cuts and steel-plates, finely executed, add to the value of this work, which, we understand, has already had a very extensive sale.

Observations on the Proposed Breakwater in Mount's Bay, and its Connection with a Railway into Cornwall. By Seymour Tremenhoe, Esq. Smith and Elder, Cornhill.—This is a very well written pamphlet, and the reasons given for the proposed breakwater are cogent and good. Of the utility of the project, and fitness of the situation for a harbour of refuge, there can be no doubt; but there is in our mind, as indeed there seems to be in the author's, very great doubt how far a railway to it would pay.

Railways and Public Works in Ireland. By Geo. Lewis Smith, Esq.—We have in our last mentioned this very able pamphlet in our observations on the Irish railways. The subject on which it treats is now one of such paramount interest, from the attempt to bring on the Irish job, that no man who wishes to understand the matter should be without it. Frightful as Mr. Smith's picture is of Government jobs and extravagance in Ireland, we understand it is much within the truth, and if he has to plead guilty to anything, it is to too much forbearance.

Railway Papers; No. 1.—The object of this pamphlet is to puff off Mr. Kollmann's (mis-spelt in our pages Colman), patent railway, noticed by us p. 456, &c., of No. 34. We believe the author visited almost all the railway offices in London some little time since, courting them to adopt his panacea for curves, gradients, &c.; but it would not do, and we think his pamphlet, with its endless blunders, will do less.

Theory, Practice, and Architecture of Bridges. By James Hann, of King's College, &c., and Wm. Hosking, F.S.A., &c. Weale, Holborn.—In this work, of which the first number is before us, Mr. Hann conducts the theoretical and Mr. Hosking the practical part. From the single number before us we can hardly anticipate what this work is likely to be; but the subject is one on which a good treatise is much wanting. The present number consists of, we suppose, a mere introductory sheet on the theory of bridges, and "Papers on Bridges," containing some from Gauthy on the "General Principles that ought to regulate the Construction of Bridges, and determine the Dimensions of their several Parts." Both of these subjects are differently pagged; from which we judge that it is intended to make the work consist of two parts, one of which contains the theory of bridges, and the other, a collection of papers from different authors. If this be the plan, we do not think it a good one. Books may be made in this way with very little labour; but useful treatises never can. What we should like to see is a clear and tolerably concise theory in one part, and a good, well-digested, practical treatise in the other; including a neat history of the successive advances in the art, from the rude wooden structure to the elegant stone, brick, and iron bridges of our times, and the novel wooden laminated arches on the North Shields Railway, with an account of the most remarkable bridges that have been made, the difficulties that were encountered in their construction, and the arts that were employed to overcome them. This would combine instruction with amusement; and be a work which the man of science, the amateur, the professional, and practical man might consult with pleasure and advan-

tage. Possibly such may come within the plan of the authors. If it do, we shall be happy to see it, and to find that it be deserving of our highest praise.

The present number contains the best and closest likeness we have yet seen of George Stephenson the engineer, and some well-executed plates, particularly of those celebrated structures in the north—the Victoria bridge, and the wooden viaducts on the Newcastle and North Shields Railway.

Freeling's London and Birmingham Railway Companion.—A handy little book, and will form a useful travelling companion. The style is clear and unaffected, and the matter has been well selected.

The Year-book of Facts in Science and in Art. By the Editor of the Arcana of Science. London: Simpkin and Marshall, 1839.—The editor, a gentleman well-known to the literary world, has in this cheap and portable volume produced an annual register of the useful arts. Under the different heads is classified all the information which could be derived from the various scientific periodicals, and it is gratifying to us, not as a motive of vanity, but as showing that we have done our duty towards our subscribers, to see that our Magazine has been able to contribute so large a portion of its contents. In these days, and in this year, truly called by the editor, an “Annus Mirabilis” of Science; it is necessary for every one who does not wish to be thrown back by the stream, to make himself acquainted with the progress of science, and to no manual can we with more justice recommend our readers than to this well-digested compilation.

Lithographed Drawings of the London and Birmingham Railway. By John C. Bourne. With Topographical and Descriptive Accounts. By J. Britton, F.S.A. Ackerman.—We have received the second part of this beautiful work, and are happy to perceive that it exhibits, if possible, an improvement upon the first. The subjects are equally well-chosen, and delineated with the same fidelity and exquisite effect. Mr. Bourne seems to have adopted the method of all others best calculated for the illustration of his subject, and his drawings may fearlessly challenge a comparison with those of the first landscape painters of the day. The Watford embankment, the viaduct over the Colne, and that at Wolverton, and the two interior views of the Kilsby tunnel (which, with a beautiful map of the line, and four other drawings, constitute the present number), will fully bear out our remarks. The views in the Kilsby tunnel present a most striking and singular effect, which could not have been produced by any other mode of execution, so well as by the new style of lithography. The drawing of the excavation near Park-street, with its myriads of workmen and implements, is, we think, as excellent an illustration of the vastness of this great commercial speculation, as can be conceived, nor is the scene at all deficient in pictorial effect. Upon the whole, this work seems likely to prove a worthy illustration of the great undertaking to which it is devoted.

Hints to Mechanics upon Self-Education and Mutual Instruction. By Timothy Claxton.—London: Taylor and Walton, 1839.—This is one of those amusing pieces of autobiography, which furnish the pleasantest insight into practical life. The author, who is well known for his endeavours in behalf of his fellow mechanics, has very powerfully shown, both by reason and example, the means which every man possesses of promoting his moral, social, and intellectual progress. The account of Mr. Claxton's labours in Russia and America, furnish some very interesting particulars with respect to machinery in those countries; but we regret that our limited space does not permit us to avail ourselves of them.

The work is a practical illustration of Horace's mixture of the “dulce

cum utile," and no one will regret either the time or the expense which he may employ in perusing these few pages.

South Australia in 1837, in a Series of Letters, with a P.S. to 1838. By R. Gower, Esq.—Authentic communications respecting countries little known are of high importance; especially when strong incentives exist to induce emigration from our island. The internal evidence of truth is strong, respecting the statements advanced by Mr. Gower. He has also had the opportunity of comparing a residence in Van Diemen's Land with one in Adelaide. To the latter he assigns convincing reasons for his preference. He justly mentions some of the evils attendant on convict settlements. An account is given of the different districts into which South Australia is divided, with a description of the town of Adelaide and its vicinity. This is followed by a brief account of the aborigine inhabitants, in which the author shows his solicitude for their civilization. We cannot, however, recommend the plan of their being incorporated with our military, or employed in the police. Their attention should be directed to the cultivation of the land. A brief history is furnished of the soil, productions, and animals of South Australia. Then a reply to the question, What have the settlers already done? Mr. Gower shows his judgment in censuring the directors of the company, for employing their capital in building ships, carrying on the whale fishery, and engaging in other mercantile pursuits. The prices of provisions, the rate of wages and of rents, together with the kind of labourers most wanted, are stated; and correct information afforded of the articles requisite to be provided for those who intend to emigrate. We highly approve of the cautions given for attending to the character of the persons who are to be conveyed without expense during the voyage, and also for the preserving as much as possible an equal number of males and females. The publication is well calculated to communicate information on subjects which much interest the public.

Dr. Arnott's Mode of warming Houses.—This author well deserves the thanks of the nation. He has showed a disinterestedness and a patriotic generosity which must secure admiration. Whether the system explained be perfect or not, is not the question. Investigation is invited; and no danger incurred from being supposed to invade a patentee's claim, if an improvement be introduced. Dr. Arnott's explanation of the construction of his stoves is clear, though we have heard of many failures in those who professed to follow his plan. We have also been gratified in reading the outlines of a lecture on Dr. Arnott's stove, at the Southampton Mechanics' Institution, and the exhibition of one for the benefit of small families, capable of roasting, boiling, frying, baking, and supplying hot water, by the same fire, and which will not cost 2d. per day. The fact was tried in the presence of a large company, who partook of an excellent supper cooked by the apparatus which Mr. Burd had previously explained; all agreeing to attest the saving of expense, the safety of the system, together with the cleanliness and ease in which the operations can be carried on. We trust, therefore, the subject will receive the attention which it justly merits.

Guide to the Great Western Railway.—A neat little book this, giving a pretty fair history and progress of the line and its works, together with an account of the proceedings of the aqueous extension of the line in the proceedings of the Great Western Steam-Ship Company.

RAILWAY NOTICES AND STEAM NAVIGATION, &c.

Anti-Coal Monopoly Association.—*Coal Combination.*—A pamphlet by W. S. Northhouse, Esq., Parliamentary agent, and provisional secretary to the above association, with the correspondence of the lord mayor : Thomas, Finch Lane.—This association is the most gigantic conception, uniting the most comprehensive views with the minutest details we ever knew. To carry it out must have required indomitable courage and untiring perseverance. The pamphlet before us shows what a formidable body the coal-owners of the north, and the factors and buyers of the north are—singly a host, but united impenetrable, and we should have thought invincible. They appear to have baffled both Houses of Parliament year by year, and grown stronger from every attack. Mr. Northhouse, in his dedication to the lord mayor, says :—

"We have had committees of both Houses of Parliament sitting from day to day, month to month, session to session, hearing evidence, making 'reports,' issuing bales of blue books, and yet there was no remedy ;—nay, worse than that, the evil increased—the combination became more stringent and universal—prices got higher—the poor were perishing in our streets, and the increased and increasing population of London in 1838 were not able to procure, by upwards of 45,000 tons, the quantity of coal they did procure when they were probably 25,000 fewer in number in the year, 1837 ; it being at the same time proved, by Sir John Hall, that in spite of all the reports and all the remedies, the combinator had contrived to increase the prices since 1834 no less than 42 per cent."

The Anti-Coal Monopoly Association was formed to meet these evils by a combination of consumers with capitalists, and to supply all London with coals, (or as small or as large a proportion of the population as might choose to join), by means of a machinery which avoids all individual risk and responsibility—requires no deed or Act of Parliament—steers clear of the laws of trading and partnership—seeks no profit—refuses all deposits—and repudiates the self-election of directors, officers, or any other of the too frequent "jobberies" of joint-stock companies. London has rung with this scheme from side to side—people were amazed at its boldness, yet when examined it is found to be sound and practical in every part. The successive advertisements for contracts that have appeared prove that it is already in active operation, and that the gentlemen of the provisional committee are as spirited in their operations as they were magnificent in their conceptions. Science owes much to the name of Rennie, —when this association shall have produced cheap coals to the whole of the people, humanity and the public good will owe still more, though we believe that the gentleman who is indefatigably toiling in this cause, is not one of the celebrated engineers.

The pamphlet opens a wide field of inquiry—too wide for us at the end of the month, but we may possibly return to it in our next.

Austrian-Russian Railroad, to connect the Danube and the Black Sea.—It appears from a letter published in the *Augsburg Gazette*, that the establishment of a railroad between Sschernowoda and Rostendsche, which was to open a direct communication between the Danube and Black Sea, will not be continued this year, nor until the Porte gives its consent to the project. The project of opening a canal has been abandoned. The railroad in question is not to go from Sschernowoda, but from Rassowa, which is at no great distance from the latter, to Kostendsche, where the rampart or wall of Trajan formerly commenced. Meantime the railroad in its present state is to be made use of for the transport of goods and provisions.

Were the railroad once executed, a distance of more than two days would be gained, and the undertaking would also be of great importance for the trade and navigation of the Lower Danube.—*Morning Herald*.

Balloting for Directors.—We lament to see that the directors or solicitors of the Eastern Counties Company, have fed the ignorance or knavery of the ex-secretary's paper, with legal opinions from Messrs. Mereweather, Rolfe, and Austin, on this stupid question. The articles in our last had amply satisfied all sensible men. What in the name of goodness have lawyers to do in the matter? The proper men to consult on the meaning of words are literary men, not lawyers. Should we ask them which was the legal way to solve a mathematical problem? This would be just as good a question to scratch their wigs on as that.

Birmingham Railway.—A handsome massive silver inkstand, weighing about 120 ounces, was presented to Captain Moorsom, lately one of the secretaries, by the officers of line, in token of their personal regard and esteem, on his retirement from the office of secretary.

We understand a clause is intended to be forced on this company by the Legislature, to the effect that they shall be compelled to sell their additional shares, and call up all the funds they are entitled to by their Acts, before Parliament will grant them power to raise more money.

Birmingham and Derby Junction Railway.—The works on this line are progressing rapidly and very satisfactorily in every respect. The directors in their February report to the proprietors, stated their full expectation that the line from Derby to Hampton in Arden, would be opened to the public before the August meeting, of which they still entertain no doubt. The labourers employed in excavating on this line at Bingsbury, have discovered lead ore. It is said to exist in such abundance, that a mine is to be opened and worked.

Birmingham and Gloucester Railway.—This company being before Parliament to amend some points in their Bill, were opposed by the city of Worcester, which was desirous to introduce a clause to compel the company to make the branch from Worcester terminating in Abbott's Wood, "and no other," before opening the line for traffic. The company considered this a bad line both for the interests of the city and of themselves, and was desirous of making one that should terminate at Sansome Fields on the canal, by which $4\frac{1}{2}$ miles would be saved in the distance from Worcester to Birmingham. This was rejected by the parties representing Worcester, who insisted upon a clause enforcing the construction of the Abbott's Wood branch. The committee on the Bill having come to a resolution in favour of the city demands, the directors of the railway, rather than compromise the interests of their proprietary, at once withdrew the Bill. Some parties in Worcester affect to consider this as a triumph; but where will be the triumph if no branch at all is made to Worcester? The railway runs too near the city to be done without by the inhabitants, and is too far off to do without a branch. We recommend an immediate amicable arrangement. We are satisfied the directors will do all that ought to be expected of them, for it is their interest to do so, but more they should not.

Brighton Railway.—We understand that by the last report of Mr. Rastrick, given in the middle of the month, the works of the several contracts (all of which are now let, with the exception of the tunnels, which are preparing for advertisement), are progressing in a manner that must be highly satisfactory to those proprietors who, not speculating on the price of the shares, are anxious to see the undertaking brought to an early completion. Nearly 5,000 men are now employed, with 400 horses, and three locomotive engines.

Bristol and Exeter Railway.—This company is pushing steadily forward ; and every day strengthens the probability of their reaching Bridgewater as soon as the Great Western is open between Bristol and Bath. If the calls are punctually paid (which it is the interest of the shareholders to do), there will be nothing to prevent their having the ballast on board by the first day of the new year.

Chester and Birkenhead Railway.—It appears from the engineer's report that the works on this line are proceeding. The Bebbington contract embraces a distance of 2 miles and 32 chains; the earth-work amounted to 253,000 cubic yards, of which 82,000 have been already executed, leaving 171,000 yet to be done. The Brombrough and Eastham contracts extended to Plumyard Brook, a distance of 3 miles and 37 chains. The earth-work in this contract amounts to 288,000 cubic yards, of which 172,000 are yet to be finished. Post and rail fences are nearly complete throughout the whole of this contract; 220 men and 41 horses are employed on this portion of the line. The Sutton contract, 3 miles 17 chains, is proceeding satisfactorily, 150 men and 18 horses are employed on it. The Mostyn and Chester contract extends 5 miles 39 chains, and contains the greatest quantity of unexecuted work. This part of the line is expected to be ready by May, 1840. There are 447 men and 22 horses employed on this division. The total number of men employed throughout, are 1,117; horses, 98.—*Chester Gazette.*

Chester and Crewe Railway.—The general meeting of this company took place in Chester, April 24th, John Uniacke, Esq., in the chair. The meeting passed off very well, and nothing of any consequence occurred, except that Mr. Stephenson their engineer said, that he had levelled the two lines to the outport, Mr. Vignoles's to Porth Dynllaen, which he characterized as one that ought never to have been attempted; and the Holyhead one by the coast (taking in, we believe, the Ormshead line), which he said "was as smooth as the waters that flowed beside it." It was also said, that the Ruabon railroad was one of certain success, and would bring great traffic on the Chester and Crewe line.

Croydon Railway.—April 20, the directors, the committee of inspection, secretary, engineer, and chairman of the Brighton and Eastern Counties' Railways, with some other friends, in all about 40 persons, occupying 3 carriages, started from New Cross, to make what is called an experimental trip, or private opening of the line. One line of way only is yet completed, but it is expected both will be finished and opened to the public by the end of May. We believe nearly all the stations are completed, and the whole of the works, present a neat and substantial appearance. The trip was a very pleasant one, and the performance of the engine highly satisfactory. From New Cross they reached the Dartmouth Arms, $2\frac{1}{4}$ miles, at the top of the inclined plane, in $7\frac{1}{4}$ minutes; Sydenham Bridge in 10; the Jolly Sailor, in 13; and Croydon, $7\frac{1}{4}$ miles, in 18 minutes; that is at a rate of nearly 26 miles an hour. A much greater speed might have been attained, and the engineer was frequently requested to go faster, but knowing the accidents that almost constantly happen at openings, and the great number of men at work on the line, he resolved to run no risk.

Deal Pier.—The contract for this work is now signed by Mr. Dangerfield of Herne Bay, and will be proceeded with forthwith.

Dublin and Drogheda Railway.—A meeting of the English shareholders was held at Manchester, March 25, in which it was stated that Lord Morpeth, when spoken to, advised them "to push on their works;" but could say nothing as to Government aid. It was the opinion of the meeting that this line when made would be one of the most profitable in

England, and Mr. Bolton, the secretary, offered to take the works for the estimate reduced to 450,000*l.* and give his services into it for 1 year after finishing the line. He said the Ulster, a worse line, was making for 10,000*l.* a-mile. Mr. Macneil, the consulting engineer, recommended a double line from Dublin to Malahide, and in the first instance, only the two inner rails from Malahide to Drogheda. The general meeting was held in Dublin on April 12th, but owing to the abeyance in which the Government keeps the company, nothing of consequence passed.

Dublin and Kingstown Railway.—April 11, an adjourned meeting of the shareholders was held for the purpose of considering the propriety of a rise in the fares of the 2d class carriages from 8*d.* to 9*d.* per passenger. The English proprietors were those who were most anxious for the rise. There was indeed a division at the board on the subject, some directors advocating a rise and others not. Ultimately, the resolution was carried for the rise in question, by 345 to 208, to commence May 1st instant. It appeared in the course of the discussion, which was long and animated, but conducted with great good feeling, that the railway was originally to cost 150,000*l.* and to pay 20 per cent. profit. It, however, cost nearly 300,000*l.* and paid only about 4½, though the income is progressively increasing.

Out of an income of 35,000*l.* per annum, owing to the interest of borrowed capital and expenses, only 6,000*l.* is left to be divided among the proprietors. [Is there not a sinking fund going on to pay off 100,000*l.* borrowed of the Government, which is the main cause of so small a part now divided among the proprietors?—Ed.] Several gentlemen, as Mr. Cadbury, Mr. Kincaide, Mr. Twigg, Mr. Palmer, Mr. Roe, Mr. Barton, &c., addressed the meeting, some for, and some against the proposition. Mr. Pimm jun. (we believe the secretary), having been called on to give his opinion, argued very satisfactorily against the advance, though for the sake of unanimity, he would vote for it. He was an advocate for even lowering the 3d class prices from 6*d.* to 4*d.*, for which he adduced several good practical arguments. Mr. Pimm observed:—"The Brussels and Antwerp Railway is 27½ miles in length, and that between Liverpool and Manchester 30 miles, the difference in length is immaterial. During the year 1836, 523,000 persons travelled by the Liverpool line, and 873,000 by the Brussels line, but great as the difference is it becomes more striking when the relative amount of the population is considered. In Liverpool, Manchester, and Warrington, the population is 486,000, and in Brussels, Antwerp, and Mechlin, only 209,000. The increase is easily accounted for—the corresponding fares are—

Liverpool and Manchester.

s.	d.		
6	6	-	-
5	6	-	-
4	0	-	-

Brussels.

s.	d.
3	0
2	6
1	2

But the results elsewhere are equally striking. On the Paris and St. Germain Railway, 12 miles in length, the lowest rate was 10*d.* There were no complaints at either side, but the directors of that company, on calculating that they could convey a much greater number without adding materially to their expenses (exactly our case), came to the resolution to lower the fares to 15 francs [cents?] (7½) or 12 miles. The result has been such an increase of passengers as considerably to increase their income (hear)."—Abridged from *Saunders's News Letter*. We confess our opinion goes with Mr. Pimm, very forcibly advocated by Mr. Twigg. The Dublin and Kingstown Railway is only 6 miles long, and if any alteration was to be made in the fares, we should be inclined to reduce them from 1*s.*, 8*d.*,

and 6*d.*, to 9*d.*, 6*d.*, and 4*d.*, or 3*d.*; we feel persuaded it would tell better to the company in the end. It is a fact apparently strange, but when examined very easy to be explained, that an engine in an ordinary passenger-train will take along 60 or 80 persons with little or no sensible difference in the expense to that which is required to carry 20 or 15. This we were informed was observed years back on the Liverpool and Manchester line, and as Mr. Pimm justly observes, has been since noticed on the Paris and St. Germain Railway. Our sagacious neighbours immediately saw the account to which it might be turned, and reduced their fares from 1 franc, or 10*d.*, to 15 cents, or 1½*d.* The consequence, as Mr. Twigg says, was an increase in 12 weeks, from 91,000 to 130,000; and as Mr. Pimm observes, "such an increase of passengers as considerably to increase their income." So great a reduction, however, was carrying the principle too far, and nothing but the almost exhaustless resources of a capital to draw the traffic from could justify it.

Eastern Counties Railway.—A special general meeting of the shareholders took place on the 23d April, in conformity to a requisition from the Liverpool shareholders, for the purpose of annulling certain proceedings relating to the forfeiture of shares, and for empowering the directors to compel the payment of calls on certain shares, of which notice of forfeiture had been given, but which had not been confirmed by a general meeting of shareholders, as required by the Act. The chairman, Henry Bosanquet, Esq., stated that the meeting was specially convened for this purpose, and he therefore begged that the gentlemen present would confine their remarks to this subject. R. E. Harvey, Esq., (of Liverpool) said, that the object of those shareholders who had signed the requisition, was not in any manner to interfere with or embarrass the proceedings of the directors, but they considered that it was more for the interests of the *bond fide* shareholders, who had regularly and promptly paid up all their calls, that those parties who had not paid, should not be released from their responsibility by the forfeiture of their shares; and he therefore moved, "That this meeting, disapproving of the general forfeiture of shares which has been declared by the directors, doth hereby require and authorize the directors not to proceed further with such forfeiture, except in such particular cases and under such special circumstances as the directors may deem advisable for the interests of the company, but to adopt legal proceedings forthwith for the recovery of the calls due on all such of the said shares declared by the directors forfeited as they may think fit; and that it is the opinion of this meeting, that if the directors shall in special cases determine to proceed with such forfeiture, a general meeting of the shareholders ought to be called at the earliest practicable period for confirming such forfeiture under the notices already given." After this motion had been seconded by John Mather, Esq., in the usual manner, Mr. Barrett, once in the employ of the company, proposed an adjournment, for the purpose of receiving some statements respecting the affairs of the company. No one having seconded the amendment, the original motion was put by the chairman, and carried *nem. con.*

Edinburgh, Leith, and Newhaven Railway.—We have received a pamphlet by Dr. Neill, Canon Mills, in answer to a "Reply for the Directors" of the above company. There seems to us to have been a great deal of unnecessary bickering and recrimination between the two parties, which we are sorry to see. Paper wars in these cases are bad. It would be much better to settle the matter amicably. Dr. Neill is no doubt much attached to his property, which appears to be a very desirable place, and every reasonable allowance and compensation should be made for it. The

Doctor, however, accuses the directors of one or two things which ought not to be passed over. He distinctly charges the *pro tempore chairman* with being the *standing counsel* of the company; another director with being at the same time a *contractor* for furnishing stones to the railway; the *secretary* with being *law agent* for the company. Verily, if true, these are comfortable ways of doing things, with which, of course the shareholders must be acquainted and satisfied.

Great Western Railway.—The operations on this line have been continued with increasing energy and effect since we last adverted to them, and great activity now prevails in every department. During the last month the traffic on the line to Maidenhead has been steadily improving, the weekly receipts, as we understand, amounting to about 1,500*l.*, and the number of passengers to upwards of 1,100 daily. It is a very common thing for the trains to run the 22½ miles to Maidenhead in 45 to 50 minutes, including stoppages. The earthwork on the next 9 miles, to Twyford, is finished, and considerable progress is made in laying the ballast and the permanent way. The directors, we believe, anticipate the completion of the line to Twyford, for the purposes of traffic, early in June, when the entire distance to or from Paddington can be run in one hour. An engine, with a load of between 20 and 30 tons, was passed over the Maidenhead-bridge, the centerings of which have been completely eased for some weeks past. The directors have recently taken contracts for the construction of about 14 miles of the line, extending from Didcot, near Oxford, to Uffington, the boundary of the London division of the line, on which the contract works are so light as not to average more than 6,000*l.* per mile. In the course of the present month (May) the Bristol directors will receive tenders for about 30 miles of the line within their district, the contracts being advertised to be taken on the 3d and 26th instant (May). These contracts, we understand, will complete *the entire line* from London to Bristol, with the exception of a small portion near Bath, and one or two bridges, for which the plans will shortly be prepared. We believe the works are now advancing favourably on every part of the line, and that during the ensuing summer such progress will be made as to ensure the opening of the line to Didcot on the one side, and between Bath and Bristol on the other, either at the end of the present year or early in the next, as the directors may deem most expedient.

Great Western Steam-ship.—An article appeared in our last, containing a very unfair comparison of the French steam-ship *La Vélocé* with our celebrated Great Western. In this comparison, as an attempt was made to magnify the exploits of the French ship to the disadvantage of the Great Western, we wrote to Captain Claxton, the able managing director of the Great Western's company, to be informed whether our observations on the calculations were correct, and entreated him to favour us with such information as he could, to defend our national honour in the noble achievements of the Great Western, from the piratical attempts of M. Bechameil. His reply, which it is impossible for us to alter without injuring, will, we are sure, be read with interest by every one who takes a pride in the brilliant start, which, to the honour of Bristol, our country has taken of the rest of the world, in one of the most splendid enterprises ever accomplished. See our original articles.

Government and the Railways.—Mr. Moss, chairman of the Grand Junction, Mr. Glynn, chairman of the Birmingham and North Midland, and other gentlemen, have been examined in Mr. Poulett Thomson's Committee on Railroads. The committee is strictly secret; but from what we can gather, no intention exists on the part of Government to make any

unreasonable attack on the railways. The inquiry, we understand, is confined to the internal management and bye-laws of the companies. The Irish scheme is so far postponed *sine die*. Ministers act wisely.

Halifax Branch Railway.—A meeting of the gentry, merchants, tradesmen, and other inhabitants of the town of Halifax, was held on Wednesday last, Mr. George Whiteley in the chair; when the following, among other resolutions, were unanimously agreed upon:—"That this meeting is desirous to afford every facility in its power to the passing of the Bill now before Parliament, embracing the formation of a branch railway to connect this town with the main line of the Manchester and Leeds Railway, provided an assurance can be obtained that, in accordance with the pledge of the railway company, such branch railway shall be completed and opened simultaneously with the main line, and that no extra toll shall be levied in respect of such branch railway, beyond such an amount as shall bear a fair proportion to the tolls levied on the main line." "That a petition be presented to the House of Commons, praying for such alterations in the Bill as will effect the two objects referred to in the preceding resolution, and that the petition now read be adopted." A liberal subscription was entered into at the meeting, for the purpose of defraying the expense incurred in a survey of the proposed branch, which had been undertaken by Mr. Leather.—*Midland Counties Herald*.

Havre Railway.—The "*Vigie de Dieppe*" says, that at a late meeting of this company, it was decided, at the pressing instance of M. Aguada, that, in case it became impossible to entirely execute the undertaking, it should be carried into effect as far as Rouen, and that the road should terminate on the heights of Beauvoisine, and not at St. Sèvres, as originally intended, passing by Blainville, and the branch lines on Louviers and Elbeuf being suppressed. This decision was definitely adopted, and no consideration, it is said, will induce the company to modify it.—*Morning Advertiser*.

Irish Railways. April 20th.—A public meeting of the landed proprietors and merchants was held at the Thatched House, St. James's-street, for the purpose of adopting measures to induce the Government to consent to the undertaking of three great lines instead of one, as at present intended; Mr. Ellis, M.P. for Newry, in the chair. Mr. O'Connell and several Irish Members of Parliament attended the meeting. Sir W. Somerville, M.P., was of opinion that, if they were to embark in so large an undertaking as three main lines of railway, the expense would be nearer 20,000,000*l.* than 2½ millions; if so it would be absurd to imagine that the Government would advance 30 per cent. on such a sum. Mr. Birmingham, in explanation, said, that from five to six millions would cover the whole expense of three lines, according to the calculations of the commissioners themselves, terminating at Thurles, Athlone, and Carrickmacross. Sir W. Somerville confessed that he might be in error; but still he apprehended that the amount required would greatly exceed even the calculations of the commissioners. He certainly should support the Government proposition. Mr. Pim said, he appeared there as the representative of the sentiments of the large meeting recently held in Dublin on the subject, and it was the decided opinion of that meeting, that it was desirable to have three great lines, that they should be commenced simultaneously, and that it would not be prudent to allow private enterprise to take part in the proceedings. He approved of the resolution. The resolution was then put, and carried unanimously.—Mr. Reddington, M.P., moved the next resolution, which was to the effect, that the Government grant should be equally distributed to all districts in Ireland; which was carried unanimously, after some debate.—Mr. O'Connell, M.P., said, no doubt a single line was calculated

to produce dissatisfaction; but it was now their duty, if possible, to strengthen the Government. By now suggesting the adoption of three lines, he believed they would conciliate all parties; but he thought they would be acting injudiciously if they attempted to dictate to the Government in any way. He concluded by proposing a resolution to the effect that the money proposed to be advanced should be appropriated equally in carrying on three lines, one north, another west, and another south.—Mr. Blake, M.P., seconded the resolution, which was carried unanimously.—A deputation was then appointed to wait upon Lord Morpeth on the subject; and thanks having been voted to the chairman, the meeting separated.

[This is all very good; but let the Government beware how it enters upon the subject. It is easy to talk of a few millions only, by way of a trap. Let Ministers once begin, and stop if they can at 50 millions. If Government want substantially to benefit Ireland, let it give all possible encouragement to private enterprise, and where that stops is the proper point, if any, for Government to begin.—Ed. R. M.]

Launch of another Steam-ship.—Thos. Ashton Smith, Esq., celebrated in the sporting world on land and water, has launched another steam-ship in the north, which makes three vessels he has had built in furtherance of steam-ship science,—the Menai, the Glowworm, and now the Fire-King, which vessel, on her trials, has beat all the fast Liverpool boats, and is said to go easily 15 miles per hour. The Glowworm was of iron; this last is built of wood, soaked in Barry's preparation, instead of Kyan's pickle.

Leipsic and Dresden Railway.—This line was opened on the 8th ult., when the King and Queen were present.

Lancaster and Preston Railway (Queen v.).—[Road and Bridges Case]:—This was a prosecution against the above company on the construction of a bridge across the turnpike-road leading from Lancaster to Garstang. By the company's Act they had power to divert roads, &c., and to pass them by bridges not less than 25 feet wide, and 16 high. The bridge was necessarily a skew one; and in order not to have it cross at an angle less than 45°, they altered the road, which occasioned a bend, and made a bridge 25 feet wide, and 29 feet high. It was contended that this bend was inconvenient and dangerous to travellers, from not allowing them to see a sufficient distance before them. Several coachmen proved that they could see 100 yards at one end, and 113 at the other, which was enough to avoid accidents. Mr. Buck and Mr. Stephenson, engineers, gave evidence that, in their opinion, the bridge might well enough have been made at an angle of 34°. Mr. Locke, the company's engineer, and Mr. Rastrick, gave evidence that they would not venture on so acute an angle for a bridge so high. The defendants contended that they had not exceeded their powers. Mr. Baron Alexander was inclined to think so too, and on consulting with his brother Parke, left it to the jury, who returned a verdict for the defendants. [This case was omitted for want of room in our last.]

The works are going on very favourably. The engineer-in-chief reported to the board, on the 24th ult., that he could see no possible impediment to opening the line in the month of April next.

Llanelly Railway.—This line will be opened from Llanelly up to Llandibie, 16 miles, by July 1st, and the mineral produce abounding in this district will be brought down to the harbour in great quantities. Two splendid locomotives, by Hackworth, of 6 wheels each of 4 feet diameter and all 6 coupled, with 15-inch cylinders, and each engine weighing 11 tons, will be launched by the opening.

Manchester and Derby Railway.—A special meeting of the town-council of Macclesfield was held April 4th, which was attended by deputations

from the Manchester and Birmingham, the ditto Extension line, and the proposed Manchester and Derby line. The discussion first turned on the branch from Macclesfield, and some apprehensions were entertained whether it would ever be made; but Mr. Buck, the engineer, removed these by assuring the meeting that it was intended to be made, and would be within a reasonable time. The discussion then turned on a line proposed to start from Macclesfield, and pass near Cheadle, Leek, between Uttoxeter and Ashbourne, to Derby, about 42 miles. After a great deal of discussion—some asserting that the line was got up for mere fighting purposes against the Extension line; would never pay; that it was impracticable, &c.; and others quite the contrary—the deputations were desired to withdraw, and the council, after some deliberation, came to the resolution to support the new line. A similar meeting had been held at Derby, April 2d; another at Cheadle, April 16th; at third at Leek, April 18th; for which see advertisements on our wrapper. By our next we hope to have better information respecting this line.

Manchester and Leeds Railway.—It is understood to be the intention of the directors of this line to have the part of the line from St. George's-fields, Manchester, to Mill's Hill, Chadderton, completed if possible in a month. Mill's Hill is the nearest point on this line of railway to Oldham, by a direct road, distance $2\frac{1}{4}$ miles. This partial opening of the line will be a material convenience to the inhabitants of Middleton and Royton, which are both within a short distance of the railway.—*Manchester and Salford Advertiser.*

Morecambe Bay Embankment.—The "Whitehaven Herald" says that it can state, on undoubted authority, that Sir John Rennie has expressed a decided opinion on Mr. Hague's plan of crossing the bay. It is true he has given a decided opinion, but it is against it.

Midland Counties Railway.—The following is the engineer's return of the quantity of earth-work executed, and the number of men, horses, and engines, employed on the works of the Midland Counties Railway, from the 23d of March, to the 20th of April, 1839:—Earth-work executed, 374,085 cubic yards; number of men, 5,071; number of horses, 511; engines, three locomotive and one stationary; being an increase in the number of men of 582, and in the quantity of earth-work of 139,000 yards during the last month. One contract on the line is finished.

Manchester and Birmingham Extension Railway.—After one of the most protracted contests ever perhaps witnessed of 22 days, in the general standing orders' Committee, and 3 in the select, this line passed the standing orders by a majority, we understand of 1. The battle will now have to be fought in the House and Committee, and if a proportional time is to be occupied in all the stages, we expect Her Majesty's reign will hardly be long enough. Is this measureless waste of money not a disgrace to the nation? Meetings continue to be held in various parts, and petitions sent to Parliament in favour of this measure.

Northern and Eastern Railway.—The Deviation Bill to join the Eastern Counties line, has been read a second time, and is in committee, and the works are proceeding with all due rapidity.

Newcastle and Carlisle Railway.—As this railway, from its success and fine prospects, is exciting great attention, we applied to an old friend of ours, well acquainted with the undertaking, to furnish us with a few facts respecting it which might be depended on, in opposition to the inaccurate statements now circulating respecting it, and we have received the following:—

"The capital of the company is 390,000*l.* The remainder of their funds is obtained by loans.

"They have borrowed from the Exchequer Bill Loan Commissioners	£160,000
"Of which they have repaid	15,000
	<hr/> 145,000 <hr/>

and they have other loans on bonds and debentures. They have also borrowed, as will be seen by their last report (in our No. 38), out of the profits on the traffic of the line, 77,958*l.* 1*s.* 1*d.*

"It was agreed in the progress of raising funds for this company, that after the shareholders had paid 25*l.* per share, they should be allowed interest at 4 per cent. per annum, and it will be seen by the report that there has been paid on this account, 25,203*l.* 5*s.* 7*d.* The payment of this interest was stopped in 1833, and instead of money the shareholders received debentures for their interest. This continued up to 1836, when it was agreed that interest should cease (the line being then opened in good part), and that the shareholders should look to the profits of the line for their remuneration. The debentures so issued are announced to be paid off in May. At the annual meeting in March, the directors declared a dividend of 4*l.* per share, payable the 18th July next. This is, of course, quite independent of paying off the debentures issued for interest, so that in point of fact, the proprietors will shortly receive for interest and dividend, 16*l.* per share. At the said meeting in March, a shareholder put a question to the chairman, whether, if all the profit was divided, the dividend would not be greater? He said, 'Certainly, it would have been 8*l.* per share.' I think that the shareholders suffer by the plan of borrowing money from the profits and applying it to the formation of the line. The sum necessary for completing the line should have been raised either by capital or by loans as far as the capital might be deficient, but the keeping back profits after shareholders have been so long under advance (for it is upwards of ten years since this railway was commenced), is, I think, unfair towards them. The consequence is, that these shares are only at 102½ when the concern is making, though not yet quite complete, probably 8 per cent. per annum. The directors deserve, certainly, great credit for their economy. There has not been, I believe, a railway in England managed with such economy as this. It is now completed to within two miles. These are to be finished by Midsummer next. The cost, so far, is 776,000*l.* (see the last report), and this includes interest paid to the shareholders, which is not, properly speaking, an item in the cost of constructing a railway. Suppose the remaining two miles, which take the line into the town of Newcastle, cost 74,000*l.*, it will make in the whole, 850,000*l.*, being 13,000*l.* per mile, including the cost of engines and carriages, and including also 51,000*l.* paid for interest to the shareholders and on Exchequer Bills." [We believe this line was constructed without any engineer, under a committee of three directors. If generous and liberal conduct ever deserved success, we can say from experience this company well merit it, and we rejoice that a morning of great and promising prosperity has already opened upon them. We only wish they would make their accounts a little clearer; for, in good truth, we cannot understand them.]

Newcastle and North Shields Railway.—It is fully anticipated that this railway will be opened to the public on the 18th of June, the anniversary of the battle of Waterloo.—*Sunderland Beacon.*

Newcastle and North Shields Extension Railway.—In the House of Commons, Sir C. Grey opposed the second reading of the Bill. His great

objection was, that by the line proposed the railway would pass directly through the town of North Shields, instead of the slight detour that would be requisite by taking a line round the back of the town and to the north of it. The railway would pass through the principal square of the town, and through 14 streets. Mr. Lambton said, there were only 9 assents and 33 dissents, of owners—12 occupiers assenting, and 76 dissenting petitions were presented against it from the inhabitants of North Shields, commissioners of sewers, and of water and gas companies. The Bill was consequently lost by a majority of 37.

North Union Railway.—We understand the traffic on this line is beyond all previous conception, and that it will be about one of the best paying lines in the kingdom.

Nottingham and Derby Railway.—The directors of this undertaking made an experimental journey on the line from Nottingham to Long Eaton, lately. The whole line from Nottingham to Derby is to be opened on the 1st of June.—*Derby Mercury.*

Nicolai Steam-Ship.—It is well known that the Emperor of Russia is building here a large steamer, of between 700 and 800 tons, in our river. A trial of this fine vessel will be made May 1st, on the Thames. We understand her engines are made by Seaward, on the plan of Her Majesty's ship Gorgon.

Pneumatic Railway.—M. Clegg made an experiment, April 19, with his Pneumatic railway, which we have described in our last, at Messrs. Samuda's Southwark Iron Works. The worthy Monsieur did not give us an invitation, because we suppose we had in our last exhibited his piratical propensities on Pinkus, and because, probably, he thought the editor not so easily humbugged in these matters as certain titled folks may be. The main tube is said to be 3½ inches diameter; the length of the line on which it was worked about 150 feet long, with an inclination of 176 feet per mile; and it is said he drew up a train of 20 cwt. in 10 seconds, which, according to our arithmetic, is under 10½ miles an hour, not 35. Without giving any opinion of the plan, we must beg to record our suspicions of the main points published.

Preston and Wyre Railway, and Harbour.—The embankment, nearly 2 miles long in the river Wyre from Burn Naze, to the new town of Fleetwood, which is rapidly increasing in population, has been let to Mr. Tomkinson of Liverpool, for 25,000*l.* to 30,000*l.*, is already begun and expected to proceed vigorously under the able management of that gentleman. He is engaged to finish the same by the month of June, 1840.

We also hear that Captain Denham, R.N., late marine surveyor at the port of Liverpool, has been retained to carry out the improvements in the harbour, by lighting, &c. Thus the whole of the works are let, and the line it is expected will be opened for traffic, by the Midsummer of 1840.

Railway increase of Travelling.—The following are some of the effects of railways in increasing travelling. Between Stockton and Darlington, before the railway was established, there travelled per annum, 4,000 persons, now 16,000; between Bolton and Preston, 15,600, now 130,000; between Dundee and Newtyle, 4,000, now 50,000; between Brussels and Antwerp, 75,000, now 1,200,000. Between Paris and St. Germain, the railway travelling itself increased from 91,000 to 130,000, within the space of 12 weeks.

South-Eastern Railway.—We have been favoured with a sight of the resident engineer's report on the Dover tunnel for about the middle of the last month. The works were proceeding with great rapidity. Upwards

of 1,520 men were then employed, and it was expected that room would speedily be made, by the extension of the working spaces, to double in some places the numbers. But the feature which struck us the most is, an experiment on the making of lime from the local chalk. It had been found on trial, that the lime made from the chalk excavated in the works, turns out to be quite as good as the Halling lime, and costs less than $\frac{1}{3}$ ds the money. This will of course effect a great saving, and preclude the possibility of irregular supply.

South-Eastern Railway.—[Compensation Cases]:—Mr. Lewin, the landlord of a farm of 190 acres, let to Messrs. Monckton, called Fobles, in Tudely, claimed 334*l.* 13*s.* for 6*A.* 3*R.* 38*P.* of land running through the centre of the farm, dividing the buildings from about half the land; and for severance 400*l.*; the jury assessed for freehold interest of land 334*l.* 13*s.*; and for severance and other damage, 250*l.* The tenants claimed for their leasehold interest of land, 125*l.* 11*s.* 9*d.*; for severance, 251*l.* 15*s.* 9*d.*; and for inventory 22*l.* 1*s.* 3*d.*, the latter item was allowed; the jury assessed the leasehold interest of Messrs. Monckton, at 75*l.*; severance and other damage at 142*l.* 1*s.* 3*d.*—*Maidstone Journal.*

South-Eastern Railway.—[Compensation Case]:—A Sheriff's Court was held at the Town-hall, Tunbridge Wells, to assess compensation. Sir John Shelley Sidney, Bart., claimed for land at Penshurst; a compromise then took place, and the jury accordingly gave a verdict for the purchase of land, 2,800*l.*; for severance, 850*l.*, and the claims of the tenants to be referred to Mr. Langridge.—*Maidstone Gazette.*

Sheffield and Manchester Railway. [Compensation Cases; Sheriff's Inquiries]:—The following verdicts were taken by consent, we believe, except one, at Mottram, before Leigh Trafford, Esq., as sheriff's assessor:—For 15*A.* 3*R.* 9½*P.* of land belonging to Lord Stamford, 1,580*l.* 18*s.* 9*d.*; for 1*A.* 1*R.* 19½*P.* of land in Newton, the property of Mr. Marler's trustees, 355*l.*; for 25*A.* 3*R.* 28½*P.* in the township of Tintwistle, belonging to John Tollemache, Esq. (part of which is required for the tunnel), 275*l.*; for 1*A.* 1*R.* 16½*P.* in Godley, belonging to Messrs. Rowbottom, 275*l.*, damage by severance, 325*l.*, total 600*l.*—*Manchester Guardian.*

Ship Canal across the Isthmus of Panama.—Measures are in agitation among some of the American legislators, with a view of making a ship canal across the Isthmus of Panama, which connects North and South America, and thus to effect a communication between the Atlantic and Pacific Oceans.—*Manchester Guardian.*

York and North Midland Railway.—In less than three months this line will be opened to a junction at Milford with the Leeds and Selby Railway. The first six miles of the line, as far as Appleton, is nearly completed; and the last six, to Milford from Ulleskelf, is quite so! The only part that remains to do, is a portion of the Contract No. 3, at Bolton Percy; but from the great exertions that are making, no doubt is entertained but that it will be finished by the time proposed. Two powerful engines of very superior workmanship, by Stephenson, of Newcastle, and several beautiful railway train-carriages have arrived at the station, where the works are proceeding with rapidity.—*York Chronicle.*

A trial of one of the engines to be used on this line was made on the 6th April. The Lowther engine, which combines the latest improvements, was brought out, and a first and second class carriage attached, in which the directors and their friends were seated, and then proceeded to a little distance beyond Copmanthorpe. After they had viewed the works near that place, they returned, much gratified.—*Leeds Mercury.*

York and North Midland Railway.—*Experimental trip of the Directors*

and their Friends, April 19.—On Friday morning last, the directors of this company made their second trip, for the two-fold purpose of examining the progress of the works and of trying the power of the engines. At about a quarter past nine, the Lord Mayor, who is chairman of the company, accompanied by Mr. Stephenson, the talented engineer, and several of the directors and their friends, including T. Barstow, Esq. T. Price, Esq., Dr. Belcombe, Rev. W. Taylor, Rev. T. Browne, (Bishopthorpe), H. Belcombe, Esq., jun., Aldermen Sir John Simpson, Meek, Hotham, and Wilson; G. Dodsworth, Esq., R. Davies, Esq., T. Backhouse, Esq., &c., arrived at the station; when one of the first and second class carriages were immediately attached to the handsome and powerful engine the "Lowther," and exactly at 25 minutes past nine the signal was given, and the whole moved off in fine style. In 5½ minutes it arrived at the bridge which crosses the London road at Copmanthorpe, a distance of nearly three miles, being at the rate of upwards of 30 miles an hour. After passing the bridge the engineer shortened the speed, and in fifteen minutes from starting, the train had arrived near Appleton, where the line of rails at the York end of the road at present terminates, being nearly seven miles. The whole distance was gone at the rate of 28 miles per hour. At Appleton, the party dismounted and had to walk to Ulleskelf bridge, a distance of nearly two miles. Along this part of the road a great number of workmen are employed in laying the rails; this is the only part of the whole line betwixt York and the junction of the Leeds and Selby Railway that remains unfinished, and it was found in such a state of forwardness as to leave no doubt but that this section might be opened at the time first proposed by the directors, which we understand is intended to be on the 29th of next month. On arriving at Ulleskelf, a new and beautiful engine "The Ebor," was waiting with several carriages attached, to convey the party to the end of the line at Milford, where they arrived at 37 minutes past 10. This distance, which is 6½ miles, was performed in 14 minutes. From the Selby junction, the directors proceeded on foot along the road to Firburn, a distance of five miles, to examine the progress of the works at that place, which we understand were found to be most satisfactory. It became a subject of general remark, especially amongst those gentlemen who had been in the habit of travelling on railroads, that on the York and North Midland, there was a total absence of that jerk, peculiar to railroad conveyances, which Mr. Stephenson the engineer, stated to be in consequence of the construction of the rails, which we understand is entirely new, and of his own invention. It is due to the directors and those under them, to state that their arrangements, and indeed the management of the entire of this stupendous undertaking, reflect the highest honour on them, and we hail the day now within our view (as must every inhabitant who takes an interest in the commercial prosperity of our ancient city) when this railway shall be formally opened, as the commencement of a new era in our history.—Abridged from the *York Chronicle*.

CHESTER AND CREWE RAILWAY.

Half-yearly meeting, held in Chester, April 24th, JOHN UNIACKE, Esq., in the chair.

REPORT.—The directors beg to report to the half-yearly meeting of the proprietors, that the contracts for the whole of the works on the line are let to responsible contractors; that, as will be seen by a reference to the report of the engineers, the works are proceeding in a most satisfactory manner, and that it is intended that the line shall be opened to the public before May, 1840, at which time the Birkenhead Railway will also be opened.

The directors regret that a considerable balance is due on the calls. The works cannot be carried on with vigour, unless these arrears are immediately paid, and the future calls promptly answered; and it is only justice to those shareholders who have paid their instalments punctually, that those who have neglected to do so should be compelled to pay them without further delay.

The directors have therefore resolved to take legal proceedings forthwith against such proprietors as are in arrear.

The directors are desirous that the shareholders should give them their sanction at this meeting for taking loans to the extent allowed by their Act of Parliament.

In their last report the directors alluded to the probability of a line of railway being made from Chester to Holyhead, since which their conviction is still stronger that all parties interested in the matter will insist on the shortest and quickest mode of travelling being adopted between the capitals of England and Ireland.

The directors requested Mr. Stephenson to make a survey and section of the line from Chester to Holyhead, and that from Shrewsbury to Port-dynllaen, and to report on both. They are happy to say, that after very minute investigation, Mr. Stephenson's opinion is decidedly in favour of the Holyhead line, so much so, that he declares that it is an easy and cheap line to construct, and with unusually good gradients; while the works on the other would be attended with so much difficulty, and cost such an enormous sum, as would render it very inadvisable, if not impracticable, to undertake it; and that the gradients are excessively bad and cannot be improved. The Chamber of Commerce in Dublin, which reports to Government on all great works connected with Ireland, have memorialized in favour of the Holyhead line; and the directors have no doubt that when the comparative sections of the two lines (which are before this meeting), with Mr. Stephenson's report and estimate, are laid before Government and the Legislature, the line from Chester to Holyhead must be preferred and adopted. The directors feel they have been consulting the best interests of the proprietors by using the most strenuous efforts to bring about this object.

The directors are happy to say, that the requisite notices have been given for a railway from Ruabon to Chester, which, as well as the Great Holyhead, is to terminate at this company's station in Chester.

The accounts up to the 30th March last, are laid on the table for the inspection of the proprietors.

Agreeably with the provisions of the company's Act, three of the directors have been balloted out, viz., Messrs. Uniacke, Clemison, and Frost, who are eligible to be re-elected.

TO THE DIRECTORS OF THE CHESTER AND CREWE RAILWAY COMPANY.

Engineer's Office, Chester, 22d April, 1839.

Gentlemen,—We have now to report to you that considerable progress has been made in the works along the line since our last report of the 8th November.

Upon the Waverton contract there were executed in the four months ending the 1st of March, 105,000 cubic yards of earthwork, leaving 212,000 yards yet to be done. This rate of progress gives upon the average of the four months 26,250 yards per month, and eight months as the time in which the whole may be completed. Two bridges are finished, and the contractors are now making bricks to be employed in the aqueduct under the Ellesmere Canal, and other bridges upon this division. In a short time a considerable length of permanent way will be laid, and the works are proceeding in a satisfactory manner.

The middle contracts, the "Bunbury and Wardle," commencing at the termination of the Waverton, and extending to the commencement of the Crewe division, a distance of 10 miles, were let on the 25th of February to Messrs. Jackson and Bean, upon terms that have fully justified the expectation which we held out to you, not only as regards their lightness, but also the time in which they could be completed.

They have already commenced very vigorously upon both lengths. Upon the former, with the piling of the Beeston Valley bridges, and the formation of the railway upon the south side of them, and upon the Wardle division with the Cholmondeston embankment. These are their heaviest works.

Upon the Crewe contract, the works have as yet proceeded but slowly—partly from the contractor not having been put in possession of the land, and partly from the material being such as to prevent its being worked in during bad weather.

They have, however, nearly completed the embankment up to the Grand Junction Railway, and the cutting to the west of it will be through in a few weeks.

The contractor has been, up to the present time, engaged in wagoning clay down to the Weaver, for the purpose of making bricks for the viaduct, but he is now teeming from 500 to 700 yards per day into the embankment, and as there are only 50,000 yards to pass over this (the west) face, it may be completed in four months. Preparations have been made, and the materials will be moved from the Grand Junction embankment to prosecute more actively the works at this valley. The whole quantity of earth-work executed to the 1st of April, was 42,500 yards, and about three miles of the line have been fenced.

The permanent workshops for building and repairing the carriages and wagons, are in a state of considerable forwardness.—We are, Gentlemen, your most obedient servants,

GEORGE STEPHENSON, MURRAY GLADSTONE.

Mr. R. L. Jones, treasurer to the company, also read the following statement of accounts:—

Receipts and Disbursements of the Chester and Crew Railway Company, to March 31st, 1839.

RECEIPTS.		£.	s.	d.
Amount received on account of calls		74,705	0	0
Ditto interest		495	12	6
Ditto for land resold		80	0	0
		<hr/> £75,280 12 6 <hr/>		
PAYMENTS.		£.	s.	d.
Parliamentary agents, fees, counsel, witnesses, &c.		3,136	17	11
Solicitors for ditto, ditto		1,654	12	1
Engineering		2,981	18	4
Surveying		1,582	12	0
Printing, advertising, and stationery		448	16	10
Deputations' travelling expenses		726	17	3
Direction		388	10	0
Salaries		703	9	4
Rent, office furniture, &c.		142	1	9
Land and compensation		22,855	4	10
Works under contract		11,253	19	11
Sleepers, chairs, &c.		1,104	13	4

Coach building	1,562	19	4
Agents in London, Liverpool, and Manchester	151	10	2
Petty cash, parcels, postage, &c.	85	1	11
Advanced to the Great Holyhead Company	135	15	0
	48,915	2	3
Cash in bankers' hands	26,365	10	3
	£75,280	12	6

PARLIAMENTARY PROCEEDINGS.

HOUSE OF COMMONS.

BALLOCKNEY, April 8, read 2d, and committed to Mr. Lockhart and the South Scotland list: April 11, pet. of the trustees of the Glasgow and Stirling road against, ref. to the committee on the Bill, counsel ordered: April 22, rep.; report to lie on the table, and to be printed.—BIRMINGHAM AND GLOUCESTER, April 9, read 2d, and committed to Mr. Phillpotts and the East Gloucester List: April 15, pet. of trustees of the Tewkesbury, Gloucester, and Worcester turnpike-roads against, ref. to the committee on the Bill: April 16, pets. against, from and others of Clifton, Hackett, Northfield, magistrates, landowners, and others of Broomsgrove, John's Hill, and Kingsnorton, ref. to the committee on the Bill, counsel ordered: April 22, reported; report to lie on the table, and be printed.—BRISTOL AND GLOUCESTERSHIRE, April 16, pet. of inhabitants of Dursley against, ref. to the committee on the Bill, counsel ordered.—COMMERCIAL (LONDON AND BLACKWALL), March 27, pet. of Commissioners of Sewers of the City of London, and Liberty, against, ref. to the committee on the Bill, counsel ordered: April 16, pets. in favour from Gravesend, East and West India Dock Companies, port of London, Poplar and Blackwall, and Rochester, to lie on table; rep., together with the minutes of evidence taken before the committee on the company in the session of 1836, and on the company in the session of 1837, ref. to the committee on the Bill of present session: April 17, pets. against, from wharfingers and inhabitants of Southwark, company of watermen and lightermen of the river Thames, to lie on the table; from the City of London Gas Light and Coke Company, ref. to the committee on the Bill, counsel ordered; pet. of John Tulloch, pres. 11th March, ref. to the committee on the Bill, counsel ordered.—COMMERCIAL BLACKWALL, AND GREAT NORTH OF ENGLAND RAILWAY BILLS, resolved—That, under the special circumstances of the cases, those members of the committees on the Commercial (London and Blackwall) Railway Bill, and on the Great North of England Railway Bill, who signed the declaration as appointed by the Committee of Selection after the chair was taken, but before any other business had commenced, be authorized to attend and vote in the said committees respectively: April 19, pet. from Woolwich in favour, to lie on the table.—EDINBURGH, LEITH, AND NEW-HAVEN, March 27, read 2d, and committed to Mr. Gibson Craig and the South Scotland List; pet. of Dr. Patrick Neill against, ref. to the committee on the Bill, counsel ordered: April 8, pet. of the magistrates and town-council of Leith against, to lie on the table: April 19, pet. of the Provost of Leith against, ref. to committee on the Bill; April 22, pet. of Alexander Jamieson against, ref. to the committee on the Bill, counsel ordered.—GREAT WESTERN, April 15, ordered—That the Bill be re-committed to the former committee, and that the committee have leave to sit and proceed thereupon on Thursday next: April 16, pet. of proprietors of land in the county of Berks against, ref. to the committee on the Bill,

counsel ordered: April 18, ordered—That the chairman of the committee on the Great Western Railway Bill, constituted of the members who attended this day, do report the said Bill on Monday next: April 23, re-committed report to lie on the table, and be printed; ordered—That the report from the committee on the Great Western Railway Bill, which was ordered to lie on the table on the 25th day of March last, and the report from the committee to whom the said Bill was re-committed, and which was ordered to lie on the table, and to be printed, on the 22d April instant, be taken into consideration on Tuesday next.—**GREAT NORTH OF ENGLAND**, April 9, pet. of Sir Wm. Chaytor, Bart., against, ref. to the committee on the Bill, counsel ordered: April 22, reported, report to lie on the table, and be printed.—**GREAT CENTRAL IRISH (CELLRIDGE AND MULLINGAR)**, April 8, pet. for enlarging the time to present a pet. for a Bill until 30th of April, ref. to the Select Committee: April 11, leave given to present the Bill on or before Tuesday, 30th April.

LONDON AND GREENWICH, April 8, read 2d, and committed to Mr. Attwood and the West Kent List: 22d April, rep.; rep. to lie on the table, and to be printed.—**LONDON AND BIRMINGHAM**, April 11, pet. of trustees of the Warwick and Northampton-road, members of the corporation and inhabitants of Daventry and others, for the insertion of a clause, ref. to the committee on the Bill: April 15, pet. of trustees of the Warwick and Northampton-road, members of the corporation and inhabitants of Daventry, and others, for the insertion of a clause (pres. 11th April), ref. to the Select Committee: 22d April, reported; rep. to lie on the table, and to be printed.—**LONDON AND SOUTHAMPTON (Portsmouth Branch)**, April 8th, rep. further considered, Bill recommitted to the former Committee: April 19, reported: rep. to lie on the table, and to be printed.—**LONDON AND CROYDON**, April 8th, read 2d, and committed to Mr. Kemble and East Surrey List: April 12, pet. against, from Seymour Teulon, and Thomas Bayley, and C. Green; ref. to the Committee on the Bill: 18th, reported; rep. to lie on the table, and to be printed.—**LIVERPOOL AND MANCHESTER RAILWAY (Extension) BILL**, April 17, pet. of the company of proprietors of the Manchester, Bolton, and Bury Canal Navigation and Railway, against: ref. to the Committee on the Bill; counsel ordered: April 18th, pets. against, from leasees of land at Hunt's-bank, Manchester; surveyors of highways in Salford; company of proprietors of Blackfriars-bridge, and Strangeways-bridge; ref. to the Committee on the Bill; counsel ordered: April 23, Leave given to Committee to sit this day till 5 of the clock, during the sitting of the House.—**MANCHESTER AND BIRMINGHAM**, April 15, pet. from Congleton, in favour; to lie on the table: 23d, read 2d, committed to Mr. Bootle Wilbraham and South Lancaster List; pet. of John Baskervyle Glegg, against; ref. to the Committee on the Bill; counsel ordered.—**MANCHESTER AND BIRMINGHAM (Stone and Rugby)**, April 12, pets. in favour of the application, and complaining of their names being used by the opponents without sanction, from William Loftus Lowndes, Samuel Buttery, Eliz. Hall, trustees of the municipal charities and estates of charities in Lichfield; L. Coleman, mayor; aldermen and burgesses of Lichfield, John Brough, Jane Godwin, John Felthouse, Aston Burston, and Stoke, Thomas Brough, Edward Reale, and Thomas Gutteridge, Wiggington, D. Riley, devisees in trust under the will of J. Knight, deceased, and Tamworth, to lie on the table; from the Earl of Lichfield, to lie on the table, and to be printed: leave given the Select Committee to report thereon from time to time: April 15, pet. of Stafford Stratton Baxter, agent for several parties, who have petitioned against the proposed Bill, praying for inquiry into the allegation of the pets. presented on Friday last, complaining of the petitioners' names having been used by the opponents of the measure without their sanction, and that the former

practice of the House with regard to oppositions on Standing Orders, may not be departed from, to lie on the table, and to be printed: pet. from Wilmolow, in favour of the application, to lie on the table: April 16th, pet. for Bill reported, rep. ref. to the Select Committee; pet. of Henry Adams, denying the allegations of certain pets. stating that he is opposed to the undertaking, to lie on the table: April 18th, pet. of the Earl of Lichfield, denying the allegations contained in the pet. of S. S. Baxter (pres. April 15); to lie on the table, and to be printed: pets. in favour from Chamber of Commerce of Manchester, corporation of Manchester, and bankers, merchants, and manufacturers of Manchester (boroughreeve); to lie on the table: April 19, pet. from Atherstone in favour of the Bill, to lie on the table: pet. of S. S. Baxter considered with Lord Lichfield's: April 22d, pet. from Macclesfield against the Bill: to lie on the table: April 22d, pets. of the Earl of Lichfield (presented 12th April), and of Mr. Baxter (presented 15th and 18th April), read and ref. to Mr. Poulett Thomson, Sir Robert Peel, Mr. Shaw Lefevre, Lord Stanley, Mr. Hume, Lord Granville Somerset, Mr. Loch, Mr. Green, Mr. Aglionby, Mr. Williams Wynn, Sir Eardley Wilmot, Sir James Graham, Mr. Edward Ellice, Mr. Freshfield, and Colonel Davies; power to send for persons, papers, and records; five to be the quorum; minutes of committee on pet. for the Bill referred. April 23d, pet. of manufacturers, tradesmen, and inhabitants of Middlewick against; to lie on the table: pet. of inhabitants of Rugely in favour; to lie on the table.

MANCHESTER AND LEEDS, March 27, pet. of inhabitants, housekeepers of Wakefield, against; to lie on the table: April 9, pet. of governors of the hospital and library in Manchester against; ref. to the committee on the Bill, counsel ordered: April 11, pet. of churchwardens and overseers of the poor of Manchester against; ref. to the committee on the Bill; counsel ordered: April 22, pet. against; from Joseph Jones and others, Henry Taylor, Esq., merchants and others of Halifax, and committee of directors of Aire and Calder navigation; ref. to the committee on the Bill; counsel ordered: pet. of inhabitants, housekeepers of Wakefield, against (presented 27th March); ref. to the committee on the Bill; counsel ordered.—MONKLAND AND KIRKINTILLOCH, April 8: read 2d, and committed to Mr. Lockhart, and the south Scotland list: April 22, reported; rep. to lie on the table, and to be printed.—NEWCASTLE-UPON-TYNE AND NORTH SHIELDS (Tynemouth Extension): March 27, pets. against from company of proprietors of the North Shields waterworks, and proprietors and occupiers of houses, and other inhabitants of Tynemouth, to lie on the table: pet. of the inhabitants and others of the ward of Aldgate, pres. 21st March; ref. to the committee on the Bill; counsel ordered: April 19, pet. in favour, from Newcastle-upon-Tyne, Tynemouth, Carlisle, North Shields and Tynemouth, and Hexham; to lie on the table: pets. against from commissioners for paving and improving North Shields, proprietors and managing directors of the North Shields gas works, inhabitants of North Shields, Jane Strachan, and William Linskill, Esq.; to lie on the table; motion made, and question proposed, "That the Bill be now read a second time:" amendment proposed, to leave out the word "now," and at the end of the question to add the words "upon this day six months:" question put, "that the word 'now' stand part of the question:" the House then divided, ayes 70, noes 107; words added; main question as amended put, and agreed to; Bill put off for six months.—NORTHERN AND EASTERN RAILWAY (No. 1.) Bill, April 22; read 2d, and committed to Mr. Bramston, and the South Essex list.—NORTHERN AND EASTERN (No. 2.) March 27, to enable the company to alter this line, by forming a junction with the Eastern Counties, and to provide a station and other works at

Shoreditch, and to amend the Act relating to the company; pres., read 1st, to be read 2d: April 12, pet. of the chairman and clerk of the vestry of St. Matthew, Bethnel Green, against, to lie on the table: April 15, pet. against from rector and churchwardens of Christ-Church, Spitalfields; ref. to the committee on the Bill; and Charles Bratt, and W. Bratt, ref. to the select committee; counsel ordered: April 16, pets. against, from R. Davis, W. Ingler, and James Elstone, and Thos. Nias; to lie on the table; read 2d, and committed to the South Essex list: April 17, pet. of Thomas Nias [presented 16th April], referred to the committee on the Bill; counsel ordered.—NORTH MIDLAND, March 27, reported, rep. to lie on the table: April 15, ordered that the Bill be re-committed to the former committee, and that the committee have leave to sit and proceed thereupon on Thursday next: April 18, ordered, that the chairman of the committee on the North Midland Railway Bill, constituted of the members who attended this day, do report the said Bill on Monday next: April 22, (recommitted), reported; rep. to lie on the table, and to be printed: April 23, ordered, That the report from the committee on the North Midland Railway Bill, which was ordered to lie upon the table 27th March last, and the report from the committee to whom the said Bill was re-committed, and which was ordered to lie on the table, and to be printed, on the 22d day of April instant, be taken into consideration on Tuesday next.—PRESTON AND WYRE RAILWAY AND HARBOUR, AND PRESTON AND WYRE DOCK, April 12: read 2d, and committed to Sir Hesketh Fleetwood, and the North Lancaster list: April 18, pet. of John Bourne, Esq., and William Birley, against; ref. to the committee on the Bill, counsel ordered: April 23, committee on Bill revived; leave to sit and proceed on Friday.

Railways, March 27th.—Pet. of common carriers, merchants, and others, engaged in the trade between London and Manchester, for ensuring the conveyance of goods by railways without priority or preference, to lie on the table. April 8, return pres. of all by-laws relating to railroads, imposing penalties upon persons other than those in the service of the company [addressed the 4th March]; to lie on the table. April 9th, resolved, That the further consideration of the report on Railway Bills be not entertained before the 23d day of April; account ordered of the several amounts borrowed by the railway companies, now before Parliament, in anticipation of calls of their capital stock, with the date of the last call, the amount of capital stock not called up, stating the several Acts under the authority of which the said sums have been raised (Mr. Finch). April 11, Select Committee appointed to inquire into the state of communication by railways, and to report their observations to the House; Committee to be nominated to-morrow. April 13, Committee nominated of Mr. Ponlett Thomson, Sir Robert Peel, Mr. Shaw Lefevre, Lord Granville Somerset, Mr. Thornely, Lord Viscount Sandon, Mr. Loch, Mr. Freshfield, Sir John Guest, Lord Stanley, Mr. Greene, Sir Harry Verney, Mr. B. Baring, Sir Jas. Graham, Lord Seymour; power to send for persons, papers, and records; five to be the quorum. April 15, return [pres. 8th of April] referred to the Select Committee. April 16, returns of moneys to be raised under the sanction of Acts, whereby railway companies have been incorporated from January, 1826, to January, 1839, and of sums proposed to be raised by railroad companies, session, 1839 [ordered 27 March]; laid upon the table. April 17, returns [presented 16th April] ref. to the Select Committee on railways.—Railroads (Ireland) 18th April,—pet. from Listowel, in favour of the proposed measure; to lie on the table. Railway Bills, pet. of Henry Colfins, for the insertion of clauses in all railway Bills, for removing the difficulties which prevent the public from running carriages for hire on railways; to lie on the table. April 23, pet. for the insertion of clauses in

all railway Bills for removing the difficulties which prevent the public from running carriages for hire on railways from Birmingham and Huddersfield, ref. to the Select Committee on Railways.

RAILWAYS (IRELAND).—March 27, rep. thereon def. from Monday, 8th April, till Monday, 22d April; pets. against the proposed measure from Galway county, Tuam, Fermanagh, Castlebar, and Enniskillen; to lie on the table; pet. for appointing a Select Committee to determine the best lines from Nenagh and Roscommon, to lie on the table; pet. of J. Godley and E. S. Clarke against any plan of railways prejudicial to them without an opportunity to be heard; to lie on the table. April 9, alphabetical list ordered of the names of all persons through whose property the proposed line of railroad between the cities of Dublin, and Cork, and Limerick, is intended to pass, stating whether such property is held in fee, or by virtue of a lease for lives or for years, under and corporation sole, or aggregate, lay or ecclesiastical, distinguishing the name of each person who is a member of either House of Parliament. April 16, pet. from Kilcoman and Robin, for participation in the advantage of railway communication, to lie on the table. April 18, pet. from Listowel, in favour of the proposed measure; to lie on the table: pet. of the High Sheriff and foreman of the grand jury of the county of Monaghan, praying that assistance towards the establishment of railways in Ireland, may be granted in the manner proposed by the petitioners; to lie on the table, and to be printed, 23d April: rep. thereupon deferred till Monday next. April 23, pet. from Sligo, against the proposed measure; to lie on the table: pet. from Mallow, in favour of the proposed measure; to lie on the table: pet. of grand jurors of the county of Galway for the establishment of a railway from Dublin to the port of Galway; to lie on the table: pet. for assistance to private companies to prosecute their respective lines of railway from Dromore and Parsons-town; to lie on the table. **RAILWAYS AND CANALS (IRELAND).** March 27, pet. from Waterford for allowing the deposit of 5*l.* per centum, on all such undertakings in Ireland, in lieu of the deposit now required under the standing orders; to lie on the table. **SLAMANNAN**, March 27, read 2, and committed to Mr. Lockhart and the South Scotland List. April 17, reported, and recommitted to the former Committee. **SOUTH-EASTERN DEVIATION (Dover).** April 15, two pets. of inhabitants and landowners in Kent against the application; to lie on the table. **SOUTH-EASTERN (Reigate).**—April 17, pet. of trustees of the road from Southwark to Highgate, against; referred to the Committee on the Bill; counsel ordered. **WEST DURHAM.**—April 8, read 2, and committed to Mr. Harland and the South Durham list. **WISHAW AND COLTNESS.**—April 8, read 2, and committed to Lockhart and the South Scotland list.

•• These proceedings are up to the 23d instant. The remainder, owing to their great length, must stand over until next month.

BILLS IN COMMITTEE.—Slamannan; Manchester; and Leeds; South-eastern; Preston and Wyre Railway, Harbour, and Dock; Commercial, Blackwall; Bristol and Gloucester.

Important Improvement in Gas-making.—There is now at work a self-acting gas apparatus, on the premises of Messrs. John Marsland and Brothers, Stockport, the invention of a Mr. Higinbottom of that town, which is stated as capable, after making many experiments, of producing 8,000 feet of gas from one retort, four feet in length, in twenty-four hours; this being three times the quantity usually produced from one retort on the old plan. The gas is said to be of far more illuminating power, and relieved from every impurity. One-third more gas, it is also said, is extracted from a certain quantity of coal.—*Hull Observer.*

PRICES OF RAILWAY SHARES

Those finished are marked (1); in progress (2); which have their Bills, but are not begun (3); others (4).

NAMES OF RAILWAYS.	No. of Shares.	Share.	Paid.	Prices sold at.			Dividend per Cent.
				High-est.	Low-est.	Latest Price.	
		£.	£.				
(2) Birmingham and Derby . . .	6,300	100	00	47	47	47	
(2) *Birmingham and Gloucester . .	9,500	100	40	22½	18	20½	
(2) Birm., Brist., & Thames Junc. . .	7,500	20	18	...	...	9	
(2) Bristol and Exeter	15,000	100	25	16	4	16	
(2) Cheltenham and Great Western . .	7,500	100	25	8½	8½	8½	
(2) *Chester and Crewe	5,000	50	25	24½	24½	24½	
(2) *Do., Birkenhead	5,000	50	35	42½	32½	42½	
(2) Commercial, Blackwall	24,000	25	11	10	6½	9½	
(2) Dublin and Drogheda	6,000	100	10	7	7	7	
(2) Eastern Counties	64,000	25	13	8½	7½	7½	
(2) *Edinburgh and Glasgow (old) . .	18,000	50	10	6½	5½	5½	
Ditto, ditto (new)	5,000	...	5	...	...	4	
(2) Edinburgh, Leith, & Newhaven . .	5,000	20	7	...	...	4	
(2) †Glasgow, Paisley, and Greenock . .	16,000	25	8	8	8	8	
(2) †Glasgow, Paisley, and Ayrshire . .	12,500	50	15	11	11	11	
(1) *Grand Junction (ex. div.) . . .	11,400	100	100	206	202	204½	12
(3) *Great Leinster and Munster . . .	8,000	100	5	18s 6d	18s 6d	18s 6d	
(2) †Great North of England	10,000	100	35	18	18	18	
(2) Great Western	25,000	100	65	71½	68½	71½	
(4) Harwich	11,000	20	1	...	...	½	
(2) Hull and Selby	8,000	50	25	14½	14½	14½	
(2) Llanelli Railway & Dock Co. . . .	2,000	100	70	...	...	70	7½
(1) †Liverpool and Manchester	7,968½	100	100	195	190	190	10
* Ditto ¼ shares	546	25	25	47½	45	45	
* Ditto ½ shares	7,968	50	50	76½	76½	76½	
(1) †Leicester and Swannington . . .	1,500	50	50	73½	73	73½	8
(2) London and Brighton	36,000	50	17	9	8	8½	
(1) Do. and Birmingham	25,000	100	90	158	154	158	
Do. ¼ Shares	25,000	25	5	26	24	24½	
Do. Bonds, 5 per Cent. 1843 . . .	...	...	20	...	...	...
(1) Do. and Greenwich	20,000	20	20	17	16½	17	3
Do. New Shares . . . . .	...	...	20	19½	19½	19½	
(2) Do. and Southampton	20,000	50	50	43½	42½	43	
Do. do. New	16,000	25	20	...	...	...
(2) Do. and Croydon, Trunk	20,000	20	10½	12	11½	12	
Do. New Scrip	6,666	20	10½	8½	8½	8½	
(1) †Leeds and Selby	2,100	100	100	70	70	70	
(2) Manchester and Birmingham . . .	30,000	70	15	12½	10½	12½	
(4) Do. and Do. Extension	15,000	70	7	5	4½	5	
(2) Do. and Leeds	13,000	100	50	65	64½	64½	
Do. New Shares	10,000	50	5	...	...	12	
(2) Maryport and Carlisle	4,000	50	27	...	...	...
(2) *Midland Counties	10,000	100	60	48½	43½	43½	
(1) †Newcastle and Carlisle	6,000	100	100	102½	99½	102½	4
†Ditto ¼ shares . . . . .	...	25	25	28	28	28	
(2) Northern and Eastern	12,000	100	18	10½	2½	4	
(2) North Midland	15,000	100	65	63	56½	63	
(1) *North Union	3,200	100	100	61½	58	61½	
Do. New Shares	3,200	50	50	...	...	64½	
(2) Preston and Wyre	2,600	50	44	...	...	42	
(4) †Sheffield and Manchester	7,000	100	7½	3	2½	2½	
(2) *South-Eastern and Dover	28,000	50	12	4½	3	3	
(1) St. Helen's, Runcorn Gap . . . . .	...	...	100	...	...	40½	
(1) †Stockton and Darlington	1,000	100	100	205	205	205	14
(2) Thames Haven	9,000	50	5	...	...	...
(2) *York and North Midland	6,700	50	20	20½	20½	20½	

* Those with a * are the Liverpool prices, which are to the 25th inclusive. † Scotch.
 ‡ Manchester. § Newcastle. The others are London prices to the 27th.

THE RAILWAY MAGAZINE;

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NEW SERIES.

A Few Observations on Raising Additional Capital, and Loans. By the EDITOR.

IN the observations we made last month we showed the practical working of allowing interest on the deposits and calls. We proved that it would give greater facilities, open a much wider field for the raising of capital, and that the advantages in every view of the case would be great, and the disadvantages insignificant. These observations, we understand, have occasioned a considerable sensation both in London and elsewhere. In some remarks on a reprint of our article in the "Bristol Gazette," we find the Bristol and Exeter Railway are about to adopt the plan; and that the shareholders intend to give an indemnity to the directors against any counter construction of the Act hereafter, should any one be unwise enough to raise the question. The South-Eastern Company's Bill too, which has just passed the Commons, has a clause inserted for allowing 4 per cent. on all sums paid for calls from the time the Bill shall receive the Royal assent. The same principle is followed in many of the canal and dock Bills, and its working is so obviously beneficial, that we have no doubt it will soon be universally adopted.

Besides the question we have considered, as to raising the capital, there are other plans after a line has obtained its Act, and is in the course of formation, which have been put in practice for increasing the capital, that deserve to be examined. We here chiefly allude to the plan of raising money by fractional shares, giving them a benefit equivalent to whole shares. This was attempted with success in the Southampton Railway, when their original shares were at

a ruinous discount, and when it was evident that the original estimate was nearly 50 per cent. deficient. The first shares were 20,000 of 50% each. When about 30% or 35% per share had been called up, 16,000 half, or 25% shares, were created, which were to be on a par, or to have the same individual privilege as to profits, with the original 50% shares. This supplied, in fact, only 400,000% available additional capital for the works, but it created a double amount, or 800,000% additional, for profits to be divided on. The question then is, whether this be a judicious step or not.

To answer this question we must consider in what situation the company were, and whether they could have completed the undertaking without having recourse to this measure? If they could not, it was a proceeding not only of expediency but of great prudence, for which the directors deserve the gratitude of the proprietary. Judging from the extremely low ebb of the shares at one time (as much as 28 to 29 discount on 40% paid), it was not likely that new subscribers would have been found at par, and the works must consequently have been suspended, if not the whole sum paid have been lost. To prevent such a consequence the directors hit upon the said plan of creating new half shares, to have equal claims, half share with share, on the future profits of the concern, the amounts also having to be paid up by easy instalments. This, for raising the additional capital was an excellent stroke of policy. It presented a sort of agreeable compulsion to the proprietors to find the additional capital, and thus secured the completion of the line. For having offered 4 new for every 5 old shares they held, at only two-fifths of the price of the 5 old, with a claim of four-fifths as much profit, the proprietors were, of course, obliged to take them in their own defence; otherwise the public, to which they were to be offered, if not taken by the shareholders, would have had a great advantage at their expense.

An excellent effect has also been worked on the concern. Not only has the capital been readily subscribed, but the shares, which at the time were about 70 per cent. discount on the paid up part, now average about 12 per cent. premium, on the paid up calls. For example, with the whole amount paid on the original shares, and 20% out of 25% on the half shares, the former were very lately at 42%, or 8% discount, and the latter at 40%, or 20% premium. That is, on 250% paid up old shares, there was 40% discount, and on 80% paid up new shares, there was 80% premium, making

40*l.* premium, or 12*l.* 2*s.* per cent. on the whole sum, 330*l.* paid.

So far so good, but it may be asked, What will be their effect on the profits? If we consider the line as returning so much gross revenue per annum—which is obviously independent of the cost of the line—and that a given sum more is wanting, it is of no consequence to the profit per cent. how the additional sum is raised; for this per cent. profit, which is the true view of the case, would evidently be the same under any circumstances.

If we look at the effect on the original shares, then, the more shares the profit is divided among, evidently the less it will be individually. Therefore, for the sake of the original shares, it would be better to raise any additional capital by a less than a greater number of shares; that is, by whole rather than fractional shares, having an equal profit with original shares. But in many instances, especially when shares are at a discount, that would be impossible; in the peculiar circumstances of the Southampton, it would have been madness to attempt it. Any positive injury, however, to the old shareholders, is more apparent than real. Having the option of taking the new shares, they may either keep them and reap the benefit, or part with them and pocket the premium; so that whatever advantage belongs to the new shares, they have it.

Assuming the new shares to be taken by the proprietary, there does not appear in profit to be any ultimate benefit or injury derivable from the plan, whether the additional capital be raised by whole or fractional shares. The entire advantage lies in the inducement to take this capital, that the premium, which is almost sure to attach to the new shares, brings with it. This likewise adds to the facility of completion, and so far benefits the old shares. Perhaps, also, in the eyes of the public, the premium of the new may gild the old and render them more attractive; but as to conferring other permanent or substantial advantage or disadvantage, the plan is absolutely neutral; and its whole merit consists in a sort of compulsion to supply the means to finish the works.

A method adopted in the Greenwich Company was to give a preference and security of payment of interest to new shares over the old, until a certain dividend was attained; and then all were to be on a par. Such a plan is evidently inferior to the Southampton, as it showed itself in its working. The inducement was not strong enough, and the

public consequently looked coldly upon it. To call forth the public support, some greater advantage is wanting than a mere preference at common interest subject to a contingency, even in a line like the Greenwich, which might be made a good thing of by its own traffic, if the fares were not so high, and an excellent one if extended to Woolwich, Gravesend, and Rochester.

Though the plan of the Greenwich method was not in our opinion a good one for the object to be attained, it remains to be considered how far a modification of it would not answer the purpose, and ultimately be no detriment to the original shares. Suppose, for example, to the first capital 400,000*l.*, a new one of 200,000*l.* had been wanting; and suppose the directors, conscious of the goodness of the concern, offered one of two propositions—either to guarantee to the subscribers a double dividend; or, 10*l.* per cent. until the dividend on the whole capital in the former instance, and of the old shares in the latter, should also realize 10*l.* per cent., at which time the new and old shares should be on a par. Either way would be a great inducement, perhaps an infallible one, to raise the additional sum wanted, and might not, like the Southampton, be a pressure in perpetuity of false capital on the undertaking. If the profits of the new shares were to be double those of the old until 10*l.* per cent. could be divided on the entire capital, it would produce all the present effect of the Southampton method on the new shares, and would not so much injure the old, because a time may come when they would all be of equal value. Unless the public had great confidence in the line, it might not, however, do the like good by fixing the profit at once of the new shares to 10*l.* per cent., though the event was to be the same. For there being no settled proportion between the profits of the new and old shares, it might work very injuriously for the latter.

Another effect one of these ways might work beneficial to the undertaking. As the oldest shares, which are the most numerous, would receive a great accession of income and value when the dividends reached the equalizing limit, it would keep the attention of the directors and shareholders more alive to the true interests of the concern. The advantage in prospective would teach them to give every encouragement to increase of traffic and reduction of expenditure, and more closely to study the means most conducive to that end.

There is but one objection to this fractional and prefer-

ence system, namely, supposing the new shares (as in the Southampton) are not the same in number as the original, or some multiple of it, how will it work with persons who have not a sufficient number of the old to be entitled to an allotment of the new shares, or with persons of limited means? Imagine, for example, a poor man held only one old share in the Southampton line, he could not have one new share allotted to him, because it would be more than his proportion. He must obviously have none. Either the wealthy proprietors would have all such surplus shares, or they must be sold in the market. In either case the poor man would lose his mite of the benefit. In the Birmingham Company, out of perhaps 1,600 shareholders, there are 150 holding but a single share each. All these persons, besides others who hold under five shares, which probably are many times that number, would be injured from the same circumstances of their not having the requisite number of shares to take their proportion of the new. Persons of small means may also have invested the whole of their available funds, and be unable to take more. These, too, for that very reason will suffer, even should the number of new equal that of the old shares. It may be urged that, if they are themselves unable, they could easily find others for them who could prevent a good thing from being lost. But if they happen to be ladies, or persons of retired habits, it is not likely. In fact, of 146 original shares, not taking quarter shares, in the Birmingham, 80 were held by spinsters, 2 by a widow, 10 by a Right Honourable, 31 by gentlemen, 10 by a clergyman, and 11 by tradesmen; and of these, 60 belonged to one spinster, 15 to another, and all the rest were in tens, fives, and the inferior numbers down to one. Here are persons chiefly small holders, not one of whom, perhaps, can be said to be of that class likely to know the advantage that has been given to the new shares, and who are consequently the victims of the false estimates that led them to become original shareholders.

Had these quarter shares been sold in the market as the Parliament proposed, every individual person who has here suffered from ignorance or inability, would have come in for a proportional benefit of the premium at least, which would, at the present prices, amount to about half a million. This, it cannot be denied, is the fact; but we do not now recommend such a course of Parliamentary dictation, which, it is possible, might in some cases (we do not at present see) be prejudicial.

[To be continued.]

Railways.—A List of all their Acts of Parliament, from January 1st, 1826, to January 1st, 1839, with the Sums to be raised on Shares and Loans by each Act, from Returns by Order of the House of Commons.

ARBROATH AND FORFAR.—Capital 70,000*l.*, loan 35,000*l.*, total 105,000*l.*, by 6 Will. 4, c. 34, s. 6. 78, R.A. 19 May, 1836.

AVON AND GLOUCESTERSHIRE.—Cap. 21,000*l.*, loan 10,000*l.*, total 31,000*l.*, by 9 Geo. 4, c. 94, s. 40. 45, R.A. 19 June, 1828. Loan 15,000*l.*, by 1 & 2 Will. 4, c. 12, s. 8, R.A. 30 July, 1831. In all, cap. 21,000*l.*, loan 25,000*l.*, total 46,000*l.*

AYLESBURY.—Cap. 50,000*l.*, loan 16,000*l.*, total 66,000*l.*, by 6 Will. 4, c. 37, s. 3. 172, R.A. 19 May, 1836.

BALLOCHNEY.—Cap. 18,431*l.*, loan 10,000*l.*, total 28,431*l.*, by 7 Geo. 4, c. 48, s. 27. 32, R.A. 5 May, 1826. Loan 10,000*l.*, by 5 & 6 Will. 4, c. 97, s. 1, R.A. 21 Aug. 1835. In all, cap. 18,431*l.*, loan 20,000*l.*, total 38,431*l.*

BELFAST AND CAVEHILL.—Cap. 7,500*l.*, loan 2,500*l.*, total 10,000*l.*, by 2 Will. 4, c. 35, s. 54. 63, R.A. 9 April, 1832. Cap. 26,000*l.* loan 2,700*l.*, total 28,700*l.*, by 5 & 6 Will. 4, c. 112, s. 24. 27, R.A. 9 Sept. 1835. In all, cap. 33,500*l.*, loan 5,200*l.*, total 38,700*l.*

BIRMINGHAM AND DERBY JUNCTION.—Cap. 630,000*l.*, loan 200,000*l.*, total 830,000*l.*, by 6 Will. 4, c. 35, s. 3. 200, R.A. 19 May, 1836.

BIRMINGHAM AND GLOUCESTER.—Cap. 950,000*l.*, loan 316,666*l.*, total 1,266,666*l.*, by 6 Will. 4, c. 14, s. 108. 131, R.A. 22 April, 1836.

BIRMINGHAM, BRISTOL, AND THAMES JUNCTION.—Cap. 150,000*l.*, loan 50,000*l.*, total 200,000*l.*, by 6 Will. 4, c. 79, s. 3. 139, R.A. 21 June, 1836.

BISHOP AUCKLAND AND WEARDALE.—Cap. 72,000*l.*, loan 24,000*l.*, total 96,000*l.*, by 1 Vic. c. 122, s. 54. 80, R.A. 15 July, 1837.

BLAYDON, GATESHEAD, AND HEBBURN.—Cap. 60,000*l.*, loan 20,000*l.*, total 80,000*l.*, by 4 Will. 4, c. 26, s. 53. 61, R.A. 22 May, 1834.

BODMIN AND WADEBRIDGE.—Cap. 22,500*l.*, loan 8,000*l.*, total 30,500*l.*, by 2 Will. 4, c. 47, s. 62. 69, R.A. 23 May, 1832. Loan 5,000*l.* by 5 & 6 Will. 4, c. 93, s. 2, R.A. 30 July, 1835. In all, cap. 22,500*l.*, loan 13,000*l.*, total 35,500*l.*

BOLTON AND LEIGH.—Cap. 25,000*l.* (additional), by 9 Geo. 4, c. 8, s. 2, R.A. 26 Mar. 1828. Cap. 16,500*l.* (additional*), loan 25,000*l.*, total 41,500*l.*, by 1 & 2 Will. 4, c. 11, s. 24, R.A. 30 July, 1831. Loan 60,000*l.*, by 6 Will. 4, c. 52, s. 8, R.A. 20 May, 1836. In all, cap. 41,500*l.*, loan 85,000*l.*, total 126,500*l.*

BOLTON AND PRESTON.—Cap. 380,000*l.*, loan 126,500*l.*, total 506,500*l.*, by 1 Vic. c. 121, s. 136. 160, R.A. 15 July, 1837.

* Where the word "additional" occurs, the original Act passed previous to 1826.

BRANDLING JUNCTION.—Cap. 110,000*l.*, loan 36,000*l.*, total 146,000*l.* by 6 Will. 4, c. 57, s. 5. 119, R.A. 7 June, 1836. Cap. 190,000*l.*, by 1 Vic. c. 22, s. 1, R.A. 11 June, 1838. In all, cap. 300,000*l.*, loan 36,000*l.*, total 336,000*l.*

BRIDGEND.—Cap. 6,000*l.*, loan 4,000*l.*, total 10,000*l.*, by 9 Geo. 4, c. 92, s. 39. 44, R.A. 19 June, 1828.

BRISTOL AND EXETER.—Cap. 1,500,000*l.*, loan 500,000*l.*, total 2,000,000*l.*, by 6 Will. 4, c. 36, s. 3. 247, R.A. 19 May, 1836.

BRISTOL AND GLOUCESTERSHIRE.—Cap. 45,000*l.*, loan 12,000*l.*, total 57,000*l.*, by 9 Geo. 4, c. 93, s. 46. 58, R.A. 19 June, 1828. Cap. 20,000*l.*, by 4 Will. 4, c. 2, s. 2, R.A. 26 May, 1834. In all, cap. 65,000*l.*, loan 12,000*l.*, total 77,000*l.*

CANTERBURY AND WHITSTABLE.—Cap. 19,000*l.* (additional), by 8 Geo. 4, c. 11, s. 15, R.A. 2 April, 1827. Cap. 21,000*l.* (additional), by 9 Geo. 4, c. 29, s. 3, R.A. 9 May, 1828. Loan 40,000*l.*, by 5 & 6 Will. 4, c. 82, s. 29, R.A. 21 July, 1835. In all, cap. 40,000*l.*, loan 40,000*l.*, total 80,000*l.*

CARMARTHENSHIRE.—Cap. 12,000*l.* (additional), loan 6,000*l.*, total 18,000*l.*, by 4 Will. 4, c. 70, s. 2, R.A. 27 June, 1834.

CHELTENHAM AND GREAT WESTERN UNION.—Cap. 750,000*l.*, loan 250,000*l.*, total 1,000,000*l.*, by 6 Will. 4, c. 77, s. 3. 153, R.A. 21 June, 1836.

CHESTER AND BIRKENHEAD.—Cap. 250,000*l.*, loan 80,333*l.*, total 330,333*l.*, by 1 Vic. c. 107, s. 96. 118, R.A. 12 July, 1837.

CHESTER AND CREWE.—Cap. 250,000*l.*, loan 83,333*l.*, total 333,333*l.*, by 1 Vic. c. 63, s. 101. 123, R.A. 30 June, 1837.

CLARENCE.—Cap. 100,000*l.*, loan 60,000*l.*, total 160,000*l.*, by 9 Geo. 4, c. 61, s. 34. 38, R.A. 23 May, 1828. Cap. 100,000*l.*, by 10 Geo. 4, c. 106, s. 17, R.A. 1 June, 1829. Cap. 100,000*l.*, by 2 Will. 4, c. 25, s. 2, R.A. 3 April, 1832. Cap. 60,000*l.*, by 3 Will. 4, c. 4, s. 10, R.A. 29 Mar. 1833. Cap. 20,000*l.*, by 3 Will. 4, c. 95, s. 8, R.A. 18 June, 1833. Cap. 60,000*l.*, by 1 Vic. c. 103, s. 2, R.A. 12 July, 1837. In all, cap. 440,000*l.*, loan 60,000*l.*, total 500,000*l.*

COLEORTON.—Cap. 25,000*l.*, loan 6,000*l.*, total 31,000*l.*, by 3 Will. 4, c. 71, s. 4. 14, R.A. 10 June, 1833.

COMMERCIAL.—Cap. 600,000*l.*, loan 200,000*l.*, total 800,000*l.*, by 6 & 7 Will. 4, c. 123, s. 3. 209, R.A. 28 July, 1836.

CORK AND PASSAGE.—Cap. 200,000*l.*, loan 56,000*l.*, total 266,000*l.*, by 1 Vic. c. 108, s. 86. 107, R.A. 12 July, 1837.

DEPTFORD PIER JUNCTION.—Cap. 60,000*l.*, loan 20,000*l.*, total 80,000*l.*, by 6 Will. 4, c. 63, s. 4. 119, R.A. 21 June, 1836.

DUBLIN AND DROGHEDA.—Cap. 600,000*l.*, loan 200,000*l.*, total 800,000*l.*, by 6 & 7 Will. 4, c. 132, s. 3. 201, R.A. 13 Aug. 1836.

DUBLIN AND KINGSTOWN.—Cap. 200,000*l.*, loan 70,000*l.*, total 270,000*l.*, by 1 & 2 Will. 4, c. 69, s. 66. 75, R.A. 6 Sept. 1831.

DUFFRYN LLYNVIE AND PORTHCAWL.—Loan 12,000*l.* (additional), by 10 Geo. 4, c. 38, R.A. 14 May, 1829.

DULAIS.—Cap. 10,000*l.*, loan 4,000*l.*, total 14,000*l.*, by 7 Geo. 4, c. 102, s. 45. 80, R.A. 26 May, 1826.

DUNDALK WESTERN.—Cap. 100,000*l.*, by 1 Vic. c. 96, s. 70, R.A. 3 July, 1837.

DUNDEE AND ARBROATH.—Cap. 100,000*l.*, loan 40,000*l.*, total 140,000*l.*, by 6 Will. 4, c. 32, s. 50. 58, R.A. 19 May, 1836.

DUNDEE AND NEWTYLE.—Cap. 30,000*l.*, loan 10,000*l.*, total 40,000*l.*, by 7 Geo. 4, c. 101, s. 31. 36, R.A. 26 May, 1826. Cap. 10,000*l.*, loan 20,000*l.*, total 30,000*l.*, by 11 Geo. 4, c. 60, s. 2. 5, R.A. 29 May, 1830. Cap. 100,000*l.*, by 6 & 7 Will. 4, c. 102, s. 2, R.A. 4 July, 1836. In all, cap. 140,000*l.*, loan 30,000*l.*, total 170,000*l.*

DURHAM AND SUNDERLAND.—Cap. 102,000*l.*, by 4 & 5 Will. 4, c. 96, s. 15, R.A. 13 Aug. 1834. Cap. 90,000*l.*, loan 64,000*l.*, total 154,000*l.*, by 1 Vic. c. 67, s. 40. 41, R.A. 30 June, 1837. In all, cap. 192,000*l.*, loan 64,000*l.*, total 256,000*l.*

DURHAM JUNCTION.—Cap. 80,000*l.*, loan 34,000*l.*, total 114,000*l.*, by 4 Will. 4, c. 57, s. 59. 67, R.A. 16 June, 1834. Cap. 12,000*l.*, loan 4,000*l.*, total 16,000*l.*, by 1 Vic. c. 97, s. 9, R.A. 3 July, 1837. In all, cap. 92,000*l.*, loan 38,000*l.*, total 130,000*l.*

EASTERN COUNTIES.—Cap. 1,600,000*l.*, loan 533,333*l.*, total 2,133,333*l.*, by 6 & 7 Will. 4, c. 106, s. 3. 246, R.A. 4 July, 1836.

EDINBURGH AND DALKEITH.—Cap. 70,125*l.*, by 7 Geo. 4, c. 98, s. 54, R.A. 26 May, 1826. Cap. 8,053*l.*, by 4 & 5 Will. 4, c. 71, s. 9, R.A. 27 June, 1834. Cap. 54,875*l.*, by 10 Geo. 4, c. 122, s. 3, R.A. 4 June, 1829. In all, cap. 133,053*l.*

EDINBURGH AND GLASGOW.—Cap. 900,000*l.*, loan 300,000*l.*, total 1,200,000*l.*, by 1 & 2 Vic. c. 58, s. 121. 143, R.A. 4 July 1838.

EDINBURGH, LEITH, AND NEWHAVEN.—Cap. 100,000*l.*, loan 40,000*l.*, total 140,000*l.*, by 6 and 7 Will. 4, c. 131, s. 44. 73, R.A. 13 Aug. 1836.

EXETER AND CREDITON.—Cap. 35,000*l.*, loan 12,000*l.*, total 47,000*l.*, by 2 Will. 4, c. 93, s. 55. 64, R.A. 23 June, 1832.

FESTINIOG.—Cap. 24,185*l.*, loan 10,000*l.*, total 34,185*l.*, by 2 Will. 4, c. 48, s. 51. 58, R.A. 23 May, 1832. Cap. 12,000*l.*, by 1 & 2 Vic. c. 80, s. 2, R.A. 27 July, 1838. In all, cap. 36,185*l.*, loan 10,000*l.*, total 46,185*l.*

FOREST OF DEAN.—Cap. 125,000*l.*, by 7 Geo. 4, c. 47, s. 24, R.A. 5 May, 1826.

GARNKIRK AND GLASGOW.—Cap. 28,497*l.*, by 7 Geo. 4, c. 103, s. 27, R.A. 26 May, 1826. Cap. 9,350*l.*, by 8 Geo. 4, c. 88, s. 8, R.A. 14 June, 1827. Loan 21,150*l.*, by 11 Geo. 4, c. 125, s. 2, R.A. 7 June, 1830. Cap. 89,198*l.*, by 1 & 2 Vic. c.

60, s. 1, R.A. 4 July, 1838. In all, cap. 127,045*l.*, loan 21,150*l.*, total 148,195*l.*

GLASGOW, PAISLEY, AND GREENOCK.—Cap. 400,000*l.*, loan 133,333*l.*, total 533,333*l.*, by 1 Vic. c. 116, s. 104. 128, R.A. 15 July, 1837.

GLASGOW, PAISLEY, KILMARNOCK, AND AYR.—Cap. 625,000*l.*, loan 208,300*l.*, total 833,300*l.*, by 1 Vic. c. 117, s. 104. 126, R.A. 15 July, 1837.

GRAND JUNCTION.—Cap. 1,040,000*l.*, loan 346,000*l.*, total 1,386,000*l.*, by 3 Will. 4, c. 34, s. 106. 113, R.A. 6 May, 1833. Loan 520,000*l.*, by 4 Will. 4, c. 55, s. 27, R.A. 16 June, 1834. In all, cap. 1,040,000*l.*, loan 866,000*l.*, total 1,906,000*l.*

GREAT LEINSTER AND MUNSTER.—Cap. 800,000*l.*, loan 265,000*l.*, total 1,065,000*l.*, by 1 Vic. c. 104, s. 79. 100, R.A. 12 July, 1837.

GREAT NORTH OF ENGLAND.—Cap. 1,000,000*l.*, loan 150,000*l.*, total 1,150,000*l.*, by 6 & 7 Will. 4, c. 105, s. 3. 198, R.A. 4 July, 1836.

GREAT NORTH OF ENGLAND—CLARENCE AND HARTLEPOOL JUNCTION.—Cap. 52,500*l.*, loan 17,500*l.*, total 70,000*l.*, by 1 Vic. c. 95, s. 51. 72, R.A. 3 July, 1837.

GREAT WESTERN.—Cap. 2,500,000*l.*, loan 833,333*l.*, total 3,333,333*l.*, by 5 and 6 Will. 4, c. 107, s. 3, 237, R.A. 31 Aug. 1835.

HAYLE.—Cap. 64,000*l.*, loan 16,000*l.*, total 80,000*l.*, by 4 Will. 4, c. 68, s. 50. 60, R.A. 27 June, 1834.

HECKBRIDGE AND WENTBRIDGE.—Cap. 11,300*l.*, loan 2,800*l.*, total 14,100*l.*, by 7 Geo. 4, c. 46, s. 57. 66, R.A. 5 May, 1826. Cap. 7,600*l.*, by 8 Geo. 4, c. 20, s. 6, R.A. 12 April, 1827. In all, cap. 18,900*l.*, loan 2,800*l.*, total 21,700*l.*

HEREFORD.—Cap. 23,000*l.*, loan 12,000*l.*, total 35,000*l.*, by 7 Geo. 4, c. 100, s. 39. 44, R.A. 26 May, 1826.

HULL AND SELBY.—Cap. 400,000*l.*, loan 133,333*l.*, total 533,333*l.*, by 6 Will. 4, c. 80, s. 3. 199, R.A. 21 June, 1836.

KENYON AND LEIGH.—Cap. 25,000*l.*, loan 6,250*l.*, total 31,250*l.*, by 10 Geo. 4, c. 36, s. 57. 65, R.A. 14 May, 1829.

KILMARNOCK AND TROON.—Cap. 40,000*l.* (additional), by 1 Vic. c. 105, s. 2, R.A. 12 July, 1837.

LANCASTER AND PRESTON.—Cap. 250,000*l.*, loan 83,000*l.*, total 333,000*l.*, by 7 Will. 4, c. 22, s. 102, 124, R.A. 5 May, 1837.

LEEDS AND SELBY.—Cap. 210,000*l.*, loan 90,000*l.*, total 300,000*l.*, by 11 Geo. 4, c. 59, s. 59. 69, R.A. 29 May, 1830. Loan 40,000*l.*, by 5 Will. 4, c. 57, s. 16, R.A. 3 July, 1835. In all, cap. 210,000*l.*, loan 130,000*l.*, total 340,000*l.*

LEICESTER AND SWANNINGTON.—Cap. 90,000*l.*, loan 20,000*l.*, total 110,000*l.*, by 11 Geo. 4, c. 58, s. 4. 14, R.A. 29 May, 1830.

Cap. 10,000*l.*, loan 15,000*l.*, total 25,000*l.*, by 3 Will. 4, c. 69, s. 24, 26, R.A. 10 June, 1833. Cap. 40,000*l.*, by 1 Vic. c. 66, s. 2, R.A. 30 June, 1837. In all, cap. 140,000*l.*, loan 35,000*l.*, total 175,000*l.*

LIMERICK AND WATERFORD.—Cap. 350,000*l.*, loan 250,000*l.*, total 600,000*l.*, by 7 Geo. 4, c. 139, s. 49, 57, R.A. 31 May, 1826.

LLANELLY RAILWAY AND DOCK.—Cap. 14,000*l.*, loan 6,000*l.*, total 20,000*l.*, by 7 Geo. 4, c. 91, s. 3, 5, R.A. 19 June, 1828. Cap. 200,000*l.*, loan 50,000*l.*, total 250,000*l.*, by 5 & 6 Will. 4, c. 96, s. 67, R.A. 21 Aug., 1835. In all, cap. 214,000*l.*, loan 56,000*l.*, total 270,000*l.*

LIVERPOOL AND MANCHESTER. — Cap. 510,000*l.*, loan 127,500*l.*, total 637,500*l.*, by 7 Geo. 4, c. 49, s. 75, 85, R.A. 5 May, 1826. Loan 100,000*l.*, by 8 Geo. 4, c. 21, s. 3, R.A. 12 Apr., 1827. Cap. 127,500*l.*, by 10 Geo. 4, c. 35, s. 28, R.A. 14 May, 1829. Loan 200,000*l.*, by 2 Will. 4, c. 46, s. 20, R.A. 23 May, 1832. Loan 400,000*l.*, by 7 Will. 4, c. 27, s. 2, R.A. 5 May, 1837. In all, cap. 637,500*l.*, loan 827,500*l.*, total 1,465,000*l.*

LONDON AND BIRMINGHAM.—Cap. 2,500,000*l.*, loan 835,000*l.*, total 3,335,000*l.*, by 3 Will. 4, c. 36, s. 3, 237, R.A. 6 May, 1833. Loan 165,000*l.*, by 5 Will. 4, c. 56, s. 115, R.A. 3 July, 1835. Loan 1,000,000*l.*, by 1 Vic. c. 64, s. 2, R.A. 30 June, 1837. In all, cap. 2,500,000*l.*, loan 2,000,000*l.*, total 4,500,000*l.*

LONDON AND BRIGHTON.—Cap. 1,800,000*l.*, loan 600,000*l.*, total 2,400,000*l.*, by 1 Vic. c. 119, s. 136, 160, R.A. 15 July, 1837.

LONDON AND CROYDON.—Cap. 140,000*l.*, loan 45,000*l.*, total 185,000*l.*, by 5 Will. 4, c. 10, s. 3, 190, R.A. 12 June, 1835. Cap. 100,000*l.*, by 6 & 7 Will. 4, c. 121, s. 6, R.A. 14 July, 1836. Cap. 160,000*l.*, loan 130,000*l.*, total 290,000*l.*, by 1 Vic. c. 20, s. 34, 35, R.A. 11 June, 1838. In all, cap. 400,000*l.*, loan 175,000*l.*, total 575,000*l.*

LONDON AND GREENWICH.—Cap. 400,000*l.*, loan 133,333*l.*, total 533,333*l.*, by 3 Will. 4, c. 46, s. 93, 99, R.A. 17 May, 1833. Cap. 150,000*l.*, loan 50,000*l.*, total 200,000*l.*, by 7 Will. 4, c. 50, s. 2, 3, R.A. 8 June, 1837. In all, cap. 550,000*l.*, loan 183,333*l.*, total 733,333*l.*

LONDON AND SOUTHAMPTON.—Cap. 1,000,000*l.*, loan 330,000*l.*, total 1,330,000*l.*, by 4 & 5 Will. 4, c. 88, s. 3, 141, R.A. 25 July, 1834. Cap. 400,000*l.*, loan 130,000*l.*, total 530,000*l.*, by 1 Vic. c. 71, s. 67, 74, R.A. 30 June, 1837. In all, cap. 1,400,000*l.*, loan 460,000*l.*, total 1,860,000*l.*

LONDON GRAND JUNCTION.—Cap. 600,000*l.*, loan 200,000*l.*, total 800,000*l.*, by 6 and 7 Will. 4, c. 104, s. 3, 228, R.A. 4 July, 1836.

MANCHESTER AND BIRMINGHAM.—Cap. 2,100,000*l.*, loan 700,000*l.*, total 2,800,000*l.*, by 1 Vic. c. 69, s. 164. 189, R.A. 30 June, 1837.

MANCHESTER AND LEEDS.—Cap. 1,300,000*l.*, loan 433,000*l.*, total 1,733,000*l.*, by 6 & 7 Will. 4, c. 111, s. 170. 191, R.A. 4 July, 1836.

MANCHESTER AND OLDHAM.—Cap. 75,000*l.*, loan 20,000*l.*, total 95,000*l.*, by 7 Geo. 4, c. 99, s. 46. 55, R.A. 26 May, 1826.

MANCHESTER, BOLTON, AND BURY.—Cap. 204,000*l.*, by 1 & 2 Will. 4, c. 60, s. 12, R.A. 23 Aug., 1831. Loan 46,000*l.*, by 2 Will. 4, c. 59, s. 31, R.A. 1 June, 1832. Cap. 250,000*l.*, by 5 Will. 4, c. 30, s. 6, R.A. 17 June, 1835. Loan 150,000*l.*, by 1 Vic. c. 25, s. 2, R.A. 11 June, 1838. In all, cap. 454,000*l.*, loan 196,000*l.*, total 650,000*l.*

MARYPORT AND CARLISLE.—Cap. 180,000*l.*, loan 60,000*l.*, total 240,000*l.*, by 1 Vic. c. 101, s. 89. 111, R.A. 12 July, 1837.

MIDLAND COUNTIES.—Cap. 1,000,000*l.*, loan 333,000*l.*, total 1,333,000*l.*, by 6 Will. 4, c. 78, s. 3. 246, R.A. 21 June, 1836.

MONKLAND AND KIRKINTILLOCH.—Cap. 20,000*l.* (additional), by 3 Will. 4, c. 114, s. 16, R.A. 24 July, 1833.

NANTLE.—Loan 20,000*l.* (additional), by 8 Geo. 4, c. 3, s. 2, R.A. 21 March, 1827.

NEWCASTLE-UPON-TYNE AND CARLISLE.—Cap. 300,000*l.*, loan 100,000*l.*, total 400,000*l.*, by 10 Geo. 4, c. 72, s. 53. 61, R.A. 22 May, 1829. Loan 100,000*l.*, by 2 Will. 4, c. 92, s. 3, R.A. 23 June, 1832. Cap. 150,000*l.*, by 5 Will. 4, c. 31, s. 6, R.A. 17 June, 1835. Loan 100,000*l.*, by 1 Vic. c. 23, s. 2, R.A. 11 June, 1838. In all, cap. 450,000*l.*, loan 300,000*l.*, total 750,000*l.*

NEWCASTLE-UPON-TYNE AND NORTH SHIELDS.—Cap. 120,000*l.*, loan 40,000*l.*, total 160,000*l.*, by 6 Will. 4, c. 76, s. 60. 68, R.A. 21 June, 1836.

NEWTYLE AND COUPAR ANGUS.—Cap. 15,200*l.*, loan 5,000*l.*, total 20,200*l.*, by 5 & 6 Will. 4, c. 84, s. 38. 43, R.A. 21 July, 1835. Cap. 15,000*l.*, by 1 & 2 Vic. c. 61, s. 2, R.A. 4 July, 1838. In all, cap. 30,200*l.*, loan 5,000*l.*, total 35,200*l.*

NEWTYLE AND GLAMMISS.—Cap. 20,000*l.*, loan 6,600*l.*, total 26,600*l.*, by 5 & 6 Will. 4, c. 92, s. 37. 42, R.A. 30 July, 1835.

NORTHERN AND EASTERN.—Cap. 1,200,000*l.*, loan 400,000*l.*, total 1,600,000*l.*, by 6 & 7 Will. 4, c. 103, s. 3. 192, R.A. 4 July, 1836.

NORTH MIDLAND.—Cap. 1,500,000*l.*, loan 500,000*l.*, total 2,000,000*l.*, by 6 & 7 Will. 4, c. 107, s. 3. 222, R.A. 4 July, 1836.

PAISLEY AND RENFREW.—Cap. 23,000*l.*, loan 10,000*l.*, total 33,000*l.*, by 5 & 6 Will. 4, c. 85, s. 43. 71, R.A. 21 July, 1835.

PÖLLOC AND GOVAN.—Cap. 10,000*l.*, loan 5,000*l.*, total 15,000*l.*, by 11 Geo. 4, c. 62, s. 29. 38, R.A. 29 May, 1830.

Cap. 36,000*l.*, loan 15,000*l.*, total 51,000*l.*, by 1 and 2 Will. c. 58, s. 16, 17, R.A. 23 Aug., 1831. In all, cap. 46,000*l.*, loan 20,000*l.*, total 66,000*l.*

PRESTON AND LONGRIDGE.—Cap. 30,000*l.*, loan 10,000*l.*, total 40,000*l.*, by 6 & 7 Will. 4, c. 122, s. 3. 128, R.A. 14 July, 1836.

PRESTON AND WIGAN.—Cap. 250,000*l.*, loan 83,000*l.*, total 333,000*l.*, by 1 Will. 4, c. 56, s. 70. 78, R.A. 22 April, 1831.

PRESTON AND WYRE.—Cap. 130,000*l.*, loan 40,000*l.*, total 170,000*l.*, by 5 Will. 4, c. 58, s. 3. 119, R.A. 3 July, 1835.

RUTHERGLEN.—Cap. 15,000*l.*, loan 5,000*l.*, total 20,000*l.*, by 1 & 2 W. 4, c. 35, s. 35. 59, R.A. 2 Aug. 1831.

ST. HELEN'S AND RUNCORN GAP.—Cap. 120,000*l.*, loan 30,000*l.*, total 150,000*l.*, by 11 Geo. 4, c. 61, s. 67. 75, R.A. 29 May, 1830. Loan 40,000*l.*, by 4 Will. 4, c. 3, s. 2. R.A. 26 March, 1834. Cap. 30,000*l.*, by 1 Vic. c. 21, s. 2, R.A. 11 June, 1838. In all, cap. 150,000*l.* loan 70,000*l.*, total 220,000*l.*

SAUNDERSFOOT.—Cap. 17,500*l.*, loan 8,000*l.*, total 25,500*l.*, by 10 Geo. 4, c. 108, s. 42. 48, R.A. 1 June, 1829.

SHEFFIELD AND MANCHESTER.—Cap. 530,000*l.*, loan 176,000*l.*, total 706,000*l.*, by 1 & 2 Will. 4, c. 59, s. 93. 101, R.A. 23 Aug., 1831.

SHEFFIELD AND ROTHERHAM.—Cap. 100,000*l.*, loan 30,000*l.*, total 130,000*l.*, by 6 & 7 Will. 4, c. 109, s. 67. 65, R.A. 4 July, 1836.

SHEFFIELD, ASHTON-UNDER-LYNE, AND MANCHESTER.—Cap. 700,000*l.*, loan 233,000*l.*, total 933,000*l.*, by 7 Will. 4, c. 21, s. 108. 130, R.A. 5 May, 1837.

SLAMANNAN.—Cap. 86,000*l.*, loan 20,000*l.*, total 106,000*l.*, by 5 Will. 4, c. 55, s. 27. 32, R.A. 3 July, 1835. Cap. 29,000*l.*, by 1 Vic. c. 94, s. 14, R.A. 3 July, 1837. In all, cap. 115,000*l.*, loan 20,000*l.*, total 135,000*l.*

SOUTH-EASTERN.—Cap. 1,400,000*l.*, loan 450,000*l.*, total 1,850,000*l.*, by 6 Will. 4, c. 75, s. 3. 208, R.A. 21 June, 1836.

STOCKTON AND DARLINGTON.—Cap. 100,000*l.* (additional), by 9 Geo. 4, c. 60, s. 22, R.A. 23 May, 1828.

STRATFORD AND MORETON.—Loan 10,000*l.*, by 3 Will. 4, c. 70, s. 14, R.A. 10 June, 1833.

TAFF VALE.—Cap. 300,000*l.*, loan 100,000*l.*, total 400,000*l.*, by 6 Will. 4, c. 82, s. 3. 198, R.A. 21 June, 1836.

TAW VALE (RAILWAY AND DOCK).—Cap. 15,000*l.*, loan 5,000*l.*, total 20,000*l.*, by 1 & 2 Vic. c. 27, s. 63. 85, R.A. 11 June, 1838.

THAMES HAVEN.—Cap. 450,000*l.*, loan 150,000*l.*, total 600,000*l.*, by 6 & 7 Will. 4, c. 108, s. 3. 147, R.A. 4 July, 1836.

ULSTER.—Cap. 600,000*l.*, loan 200,000*l.*, total 800,000*l.*, by 6 Will. 4, c. 33, s. 70. 77, R.A. 19 May, 1836.

WARRINGTON AND NEWTON.—Cap. 53,000*l.*, loan 20,000*l.*, total 73,000*l.*, by 10 Geo. 4, c. 37, s. 52. 62, R.A. 14 May, 1829. Loan 20,000*l.*, by 11 Geo. 4, c. 57, s. 9, R.A. 29 May, 1830. In all, cap. 53,000*l.*, loan 40,000*l.*, total 93,000*l.*

WHITBY AND PICKERING.—Cap. 80,000*l.*, loan 25,000*l.*, total 105,000*l.*, by 3 Will. 4, c. 35, s. 3. 167, R.A. 6 May, 1833. Cap. 30,000*l.*, by 7 Will. 4, c. 25, s. 2, R.A. 5 May, 1837. In all, cap. 110,000*l.*, loan 25,000*l.*, total 135,000*l.*

WIGAN BRANCH.—Cap. 70,000*l.*, loan 17,500*l.*, total 87,500*l.*, by 11 Geo. 4, c. 56, s. 69. 77, R.A. 29 May, 1830.

WISHAW AND COLTNESS.—Cap. 60,000*l.*, loan 20,000*l.*, total 80,000*l.*, by 10 Geo. 4, c. 107, s. 30. 35, R.A. 1 June, 1829.

YORK AND NORTH MIDLAND.—Cap. 370,000*l.*, loan, 123,333*l.*, total 493,333*l.*,* by 6 Will. 4, c. 81, s. 3. 179, R.A. 21 June, 1836.

Capital in joint stock	£41,610,814
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Power to raise by loan	16,177,630
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Total	£57,788,444
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EDWARD JOHNSON.

Private Bill Office, House of Commons, 16 April, 1839.

On a New Method of Printing by Electricity. By HYDE CLARKE, Esq.

THE production of drawings by electricity is a subject which seems to have engaged more attention abroad than in this country. In Russia they have long been in the practice of engraving what are called Russian snuff-boxes, which are formed of a kind of imitation platinum, and have drawings made upon them by an application to their conducting powers. Recently, Professor Jacobi, of St. Petersburg, has been encouraged by the Emperor in a course of experiments on copying copper-plates by galvanism. He uses a new compound metal, and transmits all the lines of the engraving with perfect accuracy.

The sympathy and antipathy of electricity to particular colours seem, however, to point out a means of more easily effecting the process of copying. It has long been known that electricity is repelled by a black surface, and attracted by white; and some interesting illustrations of the effects of a thunder-storm upon cattle are related in the "Philosophical Transactions." This effect has been further con-

* By 1 Vic. c. 68, the capital to be raised is limited to 335,000*l.*

firmed by an able article on the operation of lightning on the masts of men-of-war, read before the Electrical Society at one of their late meetings.

This property of colour might be so applied as, by electrical power, to produce engraved plates from prints, impressions of prints from plates or even from other prints, and an operation introduced which might, in some cases, compete with photography, and in others supersede the printing-press.

Atmospheric Resistance to Railway Trains.

By Mr. J. THOS. HACKET.

A COMMUNICATION from "Y. Z.," in your number for March, page 6, gives an interesting extract from a paper by Henry Booth, Esq., on the atmospheric resistance to railway trains, &c., stating it to be somewhat analogous to that of moving bodies in water, in which I concur. Having paid some attention to this subject, I beg leave to trouble you with a few observations on the probable advantages to be derived from a change in the figures of railway carriages. It will be found on examination, that the forms of the railway carriages now in use are most unfit for attaining high velocities, and have a tendency to oscillate, and roll considerably when rapidly moving through the air or contending against a strong head-wind. At very high velocities it is doubtful whether they could keep on the rails of even the 7-feet gage. Were it possible to construct a railroad mathematically perfect, the oscillation at high velocities would be so great, that persons ignorant of the cause would imagine the line to be exceedingly bad.

From experiments made by the late Colonel Beaufoy, an account of which is subjoined,* it appears, that cubes and short parallelopipedons, with flat ends, are difficult to draw steadily through fluids, offering great resistance and showing a considerable tendency to oscillate and roll, but particularly the cube. Cylindrical bodies, being of the same sectional area and length, were much steadier, on that account, in motion, and experienced, on an average, one-twelfth less resistance than the others, but the addition of head and stern ends to each of the bodies reduced the resistance and liability to roll or oscillate very much, changing the latter into a slight tremulous motion. Resistance from the

* This will appear in the next number of the Magazine.

friction of the sides, top, and undersides of the solids seemed to agree nearer with the law of increasing as the square of the velocity, than that of the head and stern ends. The total resistance of the bodies, at a speed of two miles per hour, was greater, and at eight miles per hour less, than it ought to be according to that law.

If, on careful examination, the laws of pneumatics and hydrostatics should prove similar, a train of carriages drawn close together, and the spaces between them covered so as to represent one body of 50 feet in length, with flat ends 7 feet square, having a sectional area of 49 feet, and supposing the total atmospheric resistance to be equal to 100 at 30 miles per hour, the friction on the sides, top, and underneath, as even surfaces, would amount to about 8, according to my calculations from those experiments, and the negative resistance of the back of the train would amount to 12, leaving the front resistance at 80. By placing a semi-cylinder to cover each end of this train, I compute the total resistance would be reduced to 37, and using pointed arched ends in their stead, it may be reduced to less than $28\frac{1}{2}$. But if we use a cylindrical body of the same sectional area and length as the above train, the resistance will be reduced from 100 to 95, and with hemispherical ends added to it, the total resistance would be reduced to $30\frac{1}{2}$. By using pointed arched ends to the cylindric body it may reduce the total atmospheric resistance to 24, and the oscillatory and rocking motion to a mere fraction.

Projections or recesses on the sides, tops, under parts of the carriages, the wheels, &c., will be found to increase the quantities of atmospheric resistance from friction on the trains, perhaps to a greater amount than may be at first imagined. [And we suspect the oscillation too.—ED.]

According to the nature of these experiments we shall suppose, that if a train of 5 carriages were separated at sufficient distances from each other on a line of railway, so as to permit the atmosphere to resist each carriage distinctly, with a force equal to 100lbs., moving at a certain velocity, the total resistance of the train would be 500lbs., but by adding isosceles triangular front and back ends to each of these carriages, it will reduce the resistance of the 5 carriages to $103\frac{1}{2}$ lbs., avoiding thereby nearly four-fifths of the resistance to which the present formed carriages are liable. Long parallelopipedons have an advantage over short ones and over cubes, the former being more easily forced through fluids and steadier in motion than the two

latter, therefore, by drawing the above carriages (omitting the ends) close together and covering the spaces between them with leather, so as to form the train of 5 carriages into one parallelopipedon, the resistance to this shaped body would be about 95lbs., but, by placing one of the triangular ends on the front of the first carriage, and another on the back of the last carriage, the total resistance will be about 31 lbs. Hence it appears that 5 carriages may be so placed in a train moving at a given velocity, that they may experience 16 times, and 10 carriages more than 30 times, the atmospheric resistance they ought to do if properly arranged. From these few statements it must appear evident that improvements in the external figures of railway carriages, engines, and tenders (which you, Sir, have recommended in some of the early numbers of your Magazine), is of the greatest importance, and merits the particular attention of engineers in the attainment of high speed. An immense saving on locomotive power, and a reduction in the wear and tear of the carriages, engines, and rails depend upon it; and, of course, an increase in the profits of the shareholders, and an additional comfort to the passengers from the steadiness of the carriages.

First Report from the Select Committee on Railways.

THIS Committee, consisting of Mr. Poulett Thomson, Sir Robert Peel, Mr. Shaw Lefevre, Lord Granville Somerset, Mr. Thorneley, Lord Viscount Sandon, Mr. Lock, Mr. Freshfield, Sir John Guest, Lord Stanley, Mr. Greene, Sir Harry Verney, Mr. Bingham Baring, Sir James Graham, and Lord Seymour, was, as our readers know, appointed to inquire into the state of communication by railways, and to report to the House thereon. They were authorized to send for persons, papers, and records, and to report from time to time their opinions, observations, and minutes of evidence to the House. The persons examined were the Chairmen and Secretaries of the Birmingham and Great Western, the Chairman of the Grand Junction, and the Secretaries of the Liverpool and Manchester, and Southampton Railways. April the 18th, 22d, 24th, and 26th, were the days occupied in obtaining evidence, on the last of which the following brief first Report was agreed to:—"Resolved, that it is the opinion of this Committee that the Chairman do move the House that the following clause be inserted in all railroad Bills now passing through Parliament, viz.:—

"And be it further enacted, that nothing herein contained shall

be deemed or construed to exempt the railway, by this or the said recited Acts authorized to be made, from the provisions of any general Act relating to railways, which may pass during the present or any future session of Parliament."

The evidence taken turned chiefly on the financial department, the by-laws, Post-office contracts, and speed of the lines, &c., of which we shall endeavour to give an analysis.

LONDON AND BIRMINGHAM RAILWAY.—*Capital, Dividends, &c.*—It appears that the original capital of this company was $2\frac{1}{2}$ millions, in 100*l.* shares, with leave to borrow 835,000*l.*, 3 Will. 4, c. 36, with power to raise money in anticipation of calls after 50 per cent. had been paid up. Of these $2\frac{1}{2}$ millions, 90 per cent. have been called up, and the remaining 10 borrowed on the security of the unpaid calls. Under the 5 & 6 Will. 4, c. 56, the 835,000*l.* was raised to one million, which has all been obtained by loan and mortgage of the tolls. A third Act (1 Vic. c. 64) gave them the power to raise another million, that is, 625,000*l.* by shares, "and 375,000*l.* by a further issue of debentures on the tolls." Of the former, only 125,000*l.* have been raised on 25,000 quarter shares, and 500,000*l.* borrowed in anticipation of calls; the other 375,000*l.* have been taken up on loan. Exclusive of all this, 500,000*l.* have been borrowed by the directors on notes at twelve months, to capitalize which, and to raise an equal sum more, the company now apply to Parliament. The sum of all is that 2,375,000*l.* have been raised on shares, 750,000*l.* in anticipation of calls, 1,375,000*l.* by debentures, all of which the company have power to capitalize, and 500,000*l.* on notes of hand, making 5,000,000*l.*, and an additional half million is now applied for, with power to add to it, and capitalize the last half million held on notes. It is the professed object of the company to capitalize all the loans.

Up to a certain date, the witnesses admitted that the interest of the loans was taken out of the capital, but afterwards out of the earnings; the interest averages about 4*l.* 8*s.* per cent. Of the dividends, the evidence was—

MR. THORNELY. In the arrangement on the dividends, your dividend on the 90*l.* paid up is at the rate of 3*l.* 17*s.* 9*d.* per cent?—It is.

But on the 5*l.* paid up on 35*l.* shares, you divide 17 $\frac{1}{2}$ per cent?—It is perfectly correct.

MR. GREENE. On what principle was the difference made in the amount of per centage paid on each description of share?—I confess I am in some difficulty when I am asked the principle; the real facts of the case are these, and I do not wish in the least to disguise them:—it arose from the circumstance of its having been reported in Liverpool that it was the intention of the directors to pay the dividend on the quarter shares on the nominal capital; a

great many shares were bought and sold under that understanding; and when it came before the directors, they found there would be so much difficulty, the price having been regulated of course by that fact, in avoiding coming to that conclusion, that even though it is true, one cannot fully justify that principle, they thought it best, as a choice of difficulties, to take that course; but so far did we think it questionable, that when we applied to our proprietors for leave to go to Parliament for a further million, I took the opportunity of stating that we should take care the dividend should be paid only on the sum paid up in future. It was admitted that no dividends can be made until the interest of the loans is paid.

Carriers.—They took the goods of Golby first, then of Pickford and Co., and lastly of Bache and Co. They would admit any others but had not the means. Their Act prevents partiality; they must carry the goods of all if they have the power, but they may restrict that power, select any carrier as their sole agent, and, as the law stands, there is no remedy against them. Other companies can put locomotives on their line by paying a toll, but they can refuse them coke, water, the use of their stations, and fixed engine, turn plates, and any assistance from their servants, unless they come to terms with the company. No parties could run on their line without their consent, and make a profit. Horses they refuse to carry unless the owner subscribe a paper taking on himself the entire risk. [We believe many common carriers give notice on their bills to that effect respecting horses.] They consider themselves under the same law as common carriers. The sole control of all the locomotive power, for the safety of persons and goods, they think it needful to hold; a divided control, even in a small degree, they have found to be dangerous. There is no limit as to the charge they can make for goods but what the word “reasonable” implies.

Tickets are given on payment of fares and expected at the last stage but one of the journey, or the fare repaid. If a person has lost his ticket, and refuse to repay or give his name and address, they have made a by-law to seize him and take him before a magistrate, which they conceive they have the power of doing under their Act for making by-laws for the management of their business, though it is not done on other lines.

Mails.—The price is settled by arbitration for carrying the mails. They are to be carried from the 1st of May, the 112½ miles in 5 hours by day and 5½ by night, at 28*l.* 4*s.* 4*d.* per day, or 10,340*l.* per year, for a day mail up and down and a night mail up and down. For this they find the large Post-office carriages, carry a guard, and two clerks to sort letters on the journey. The time is for three years; the weight carried “9 tons and a fraction.”

Cause of increase of Capital.—The great expense of stations; the tunnels, particularly the Kilsby, which cost 300,000*l.*; the

extension from Camden Town, to Euston-square, $1\frac{1}{2}$ mile, which, with the station, has cost 380,000*l.*; the excesses for land and compensation.

Locomotives.—In 1834, a locomotive cost 900*l.*; in 1836, 1,120*l.*; in 1838, 1,200*l.*; in 1839, 1,250*l.*; and the price is still rising. It is attributed to the great home and foreign demand.

Expenses.—About 50 per cent. of gross receipts. The cuttings have been very expensive, the soil unfavourable, and washed down, so as nearly to obstruct the road. There are 16 millions of earth-work on the line.—Evidence: Mr. G. C. Glyn, the chairman, and Mr. R. Creed, the secretary.

GRAND JUNCTION.—*Capital.*—There is some obscurity in the evidence of Mr. Moss on this subject, but it appears the sum raised in 100*l.* shares is 1,093,800*l.*; loan 583,922*l.*: new shares (half?) 218,360*l.*; with which 105,000*l.* of the loans have been paid off, and more is in course of payment; so that the total amount at present used for the line is 1,093,800*l.* + 583,922*l.* + 218,360*l.* - 105,000*l.* = 1,791,082*l.* No money has been raised in anticipation of calls. Have the power to capitalize the debts. Not one share was forfeited.

Length of Line and Maintenance of Way.—The line is 83 miles and 14 on the Liverpool and Manchester, or 97. The maintenance of way, including fences, has been let at 250*l.* per mile per annum, and the contractor was anxious, in case of his death, to secure the transfer of it to other parties, expecting the expenses would diminish. The contractor does not limit them as to speed but as to weight; the present engines are 13 tons—much heavier must not be put on.

Carrying.—Any person may run engines on their line; one person does run one for carrying coals; apprehends the greatest possible inconvenience from a general practice of it. On the Liverpool and Manchester, though the boards are almost the same, collisions are constantly happening from a spirit of rivalry between the engineers, which the directors find great difficulty in keeping down; is of opinion the Act should compel the company to find all the locomotive power as well as the road; no other party can use their stations, water, or guards; practically speaking the company are monopolists, and thinks they should be positive monopolists, their rules and regulations being subject to the control of competent authority.

By-Laws.—This company have no by-laws, and find no inconvenience for the want of them; thinks it would be better if the by-laws of all companies were well defined and the same.

Cause of Excess of Expenditure is the incorrect estimates of engineers; the land was estimated at 120,000*l.* or 130,000*l.*, it cost 230,000*l.* or 240,000*l.*; he blames the engineer for this, because he knew all the bargains made when the assents were obtained.

Mail and Speed.—They contract to take the mails at 23 miles

an hour, including stoppages, at 10 per cent. faster than the Birmingham Company; their average travelling is 23 miles an hour; receive about 16,000*l.* a-year for the Post-office duties.

Tickets.—Persons when they pay at Liverpool are furnished with tickets, which are collected at the top of the tunnel about a mile out; at Birmingham they are collected when the bell rings, after they have taken their seats, immediately before starting; at the other stations immediately after they have taken their seats; they would prefer being subject to the little frauds now existing to annoying honest passengers with stringent regulations.

Expenses.—About 53 per cent. on the gross returns.

Mr. Moss, the witness, is deeply in love with Royal commissions and boards. They are his panacea for every thing. He would sleep the better under a royal commission.

[To be continued.]

Mr. Coke's Question. By A MECHANIC.

TO THE EDITOR OF THE RAILWAY MAGAZINE.

SIR,—I observe in your journal for this month an inquiry from Mr. Coke respecting the practicability of working locomotive engines on the Pinxton and Mansfield Railway; the steepest gradient he states to be 55 feet per mile (or 1 in 96) with some sharp curves. A direct answer to that part of Mr. Coke's query respecting curves, viz., "What is the sharpest curve on which an engine will act drawing a load of 10, 15, or 20 tons, in an ascent such as that mentioned above?" can only be given in theory; and in the calculation, the construction of the engine, the carriages, the railway, the length of the trains, whether the train be dragged after the engine or driven before it, with many other points, must be considered. The best practical answer is to refer Mr. Coke to what has been done, and is now doing, on the following railways, which have gradients as steep, or about as steep, as on the Pinxton and Mansfield Railway, on which locomotives work well for the conveyance of both passengers and goods, viz.:—The Liverpool and Manchester, 1 in 89, and 1 in 96; Newcastle and Carlisle, 1 in 106; London and Croydon, 1 in 100; North Union, 1 in 100; Grand Junction, 1 in 117; Bolton and Preston, 1 in 132.

The practice of engineers, generally, is to avoid curves of much less than one mile radius, but a sharper curve than that would be objectionable, in a line where great speed is required, from the risk that the train would run in getting off the rails; it would not be so on a coal railway where the

carriages move at slow rates, and where a curve of half-a-mile radius could be worked without any disadvantage.

Your obedient servant,

London, May 20th, 1839.

A MECHANIC.

[The writer of the above adds the following observations on the railway in a private note.]

Mr. Coke's description of the Pinxton and Mansfield Railway is not quite correct; 4 miles has a rise of $\frac{1}{4}$ of an inch in a yard, or 1 in 96, $3\frac{3}{4}$ miles has a fall averaging, and nearly uniform, of $\frac{1}{4}$ of an inch in a yard; the rise has several curves, to the best of my recollection, not more than 100 yards radius, taking a hill-side, but could be avoided at a trifling expense by curves not less than $\frac{1}{2}$ a-mile to a mile radius; the fall is remarkably straight except at the crossing of a brook where a bridge is constructed at nearly right angles to the line of railway, and consequently forms 2 sharp angles. To remove these, all that is requisite is to substitute an askew-bridge for the present one, which is in a dilapidated state.

American Steam Navigation and Act of Incorporation.

By JUNIUS SMITH, Esq.

TO THE EDITOR OF THE RAILWAY MAGAZINE.

SIR,—I beg to enclose an Act passed by the Legislature of New York, on the 23d February last, to incorporate the American Atlantic Steam Navigation Company of the city of New York. In doing this, I trust you will indulge me in calling the attention of the public to some prominent features which distinguish an American from an English Act of Incorporation for similar purposes, and which, I conceive, militate against the commercial interests of Great Britain.

By the second section of the Act you will notice that the capital stock of the corporation is two millions of dollars, and that the company is authorized to commence operations when five hundred thousand dollars are subscribed.

By the thirteenth section you will further notice, that the corporation have all the powers, privileges, and restrictions common to all Acts of Incorporation, the most important of which is, to limit the responsibility of stock proprietors to the amount of their interest.

The thirteenth and last section is concise and simple, "This Act shall take effect immediately."

It is observable that this American Act of Incorporation *precedes* any subscription whatever, and if the objects embraced by the Act are worthy of public support, the Act, by limiting the responsibility of the subscribers, and defining the amount required to be subscribed before the Act takes effect, does throw around the enterprise that preliminary protection which facilitates the operations of the company, and goes far to ensure success.

In England, on the contrary, the uncertainty which exists upon the main point, whether you can obtain from the Legislature an Act of Incorporation, with a limited responsibility at all, or not, and, in any case, the requirement that a certain proportion of the capital intended to be raised shall be subscribed and paid up *previous* to any Act of Incorporation being granted, are direct, positive, and, in many cases, insuperable difficulties thrown in the way of the formation of a company at all.

If the great commercial interests of this country are worth protecting, surely they ought to be protected in the most efficient manner, and the least that could be done, one would think, if experience did not teach to the contrary, would be to secure those who have capital and enterprise to embark in great commercial undertakings. But if we look at the natural and unavoidable consequences of the present system, they rather startle than relieve the mind.

We all know that an English capitalist, or any other, does embark his capital in a joint-stock company, even supposing that to be a *joint-stock bank*, with great reluctance, when he knows that, in addition to his stock, his whole fortune is liable to meet the claims upon the company. In a view of a large prospective dividend, he would not regard the risk of his shares, but he does regard the bare possibility that his fortune may be involved and his family ruined. He is therefore, in a measure, compelled by a sense of duty to his family to relinquish the advantages which he and his country would derive from his capital and enterprise at home, to seek employment for the former, and security to his fortune in the limited responsibility which an American Act of Incorporation offers.

If an object is of sufficient importance to the country to justify the Government in granting an Act of Incorporation to a company to carry that object into effect, I cannot see any good reason why that Act should not be passed and then the funds raised under its authority, instead of raising

the funds first, under every possible disadvantage, and then applying for authority to use them.

Your obedient servant,

JUNIUS SMITH.

[The facts here stated demand the serious attention of our Legislators. Is it not humiliating that a mere infant country, like America, in what may be called prudential and Conservative legislation leaves us so far behind?—Ed.]

Archimedes Steam-vessel. By GEORGE RENNIE, Esq.,
F.R.S., C.E., &c., &c.

May 22d, 1839.

DEAR SIR,—Understanding that you have made some experiments with the vessel fitted up with the Archimedean screw, and there being at this time a great interest excited thereon, I should feel obliged if you would favour me with some account of her, and her performances.—I am, dear Sir, your obedient servant,

George Rennie, Esq., &c., &c.

J. HERAPATH.

Holland-street, 22d May, 1839.

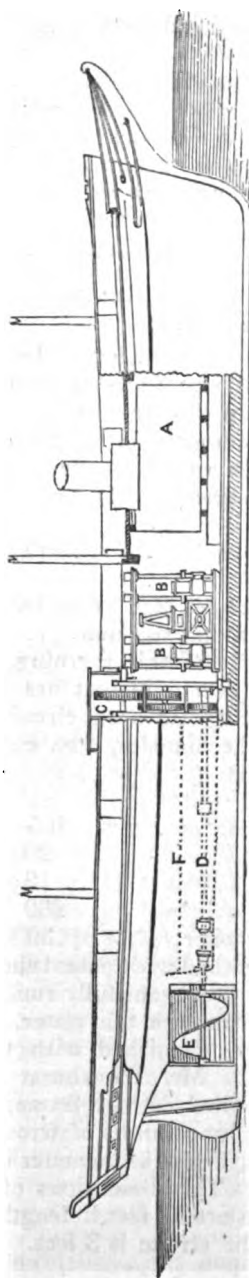
DEAR SIR,—I exceedingly regret that the time you have allowed me for replying to your letter of this morning, has been so limited; nevertheless, as much interest has been excited, and many contradictory reports been circulated, relative to the performance of the Archimedes, I have great pleasure in acceding to your request.

The following are the particulars:—

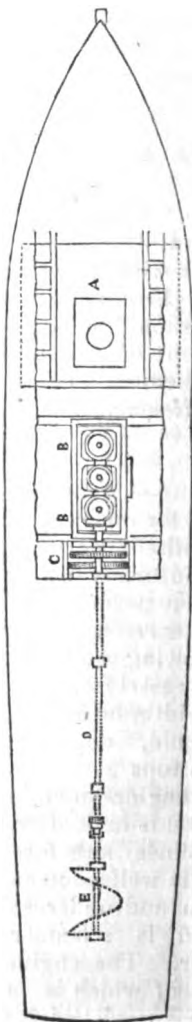
Length of vessel from stem to stern	105 feet
Extreme width, in feet	20 $\frac{1}{2}$
Depth of hold, do.	12 $\frac{1}{2}$
Burthen in tons	230
Length of engine-room, including boiler	39 feet.

The vessel is built of fir, and sheathed with patent sheathing. The lines both fore and aft are beautifully run, and the vessel is well calculated to go through the water, both with steam and under sail. She is furnished with three masts, and is schooner rigged. Mr. Wimshurst was the builder. The engines are united in one frame, the upper part of which is supported by columns of wrought-iron. They consist of 2 cylinders, 3 feet in diameter each, and one air-pump between them. The dimensions of the platform on which the engines rest are 12 feet in length, by 4 feet in width. The length of the stroke is 3 feet. The

ARCHIMEDES STEAM VESSEL.



Scale. 100 Feet.



A. Boilers. B. Engines. C. Wheel-work, connecting Engine and Propeller Shafts.
D. Propeller Shafts. E. Propeller, or Srev. F. Line of Cabin floor.

power is estimated at 90 horses. The motion is given to the cranks by means of double side-rods, the joint length of which is 8 feet, by which the advantages of long connecting rods are obtained. The hand-levers, the blow-off, and injection cocks, are so arranged as to be under the immediate command of the engineer. The wheel-work, which consists of two cogged wheels and two pinions, is placed in a strong iron frame independent of the vessel. The shaft which drives the propeller passes from the lowermost pinion under the cabin floor, and through a water-tight stuffing-box in the inner stern-post, to the propeller or screw. The screw is made of plates of iron fastened to arms of wrought-iron, keyed upon a wrought-iron shaft, and when the engine is at work makes 5 $\frac{1}{2}$ turns for every complete revolution of the crank-shaft. The boiler is made to suit the shape of the vessel, upon the usual principle of low pressure, with the exception of containing a double set of flues, so arranged as to obtain the greatest quantity of surface.

The weight of the engines, and boiler, chimney, coal-boxes, driving-machinery, and propeller, is 64 tons 8 cwt. So far the description.

The merit of this new application of the screw to propelling vessels is due to Mr. Smith; for although it is not a new invention, the failure of all the experiments which have hitherto been tried, and the perseverance he has shown in bringing the principle forward once more, entitle it to be considered in the light of a new application. Mr. Smith's first trial was made upon a small boat of about 30 tons burthen, with a screw fixed in the dead wood of the stern; the screw was driven with sufficient rapidity to give a velocity to the boat of 5 or 6 miles per hour, and its power was evinced by its towing the Great Western steamship into the East India Docks. The success of this small vessel induced some spirited noblemen and gentlemen to patronize it, and the result has been the formation of a company to try the experiment upon its present scale. The success of the first experiment was not sufficiently convincing in the minds of many, and the failure of the *Archimedes* was almost universally predicted.

The whole being completed, a trial was made for the first time in the River Thames, between Blackwall and Barking Creek, on the 30th of April, and although every thing was stiff and new, the speed by the log was 8 $\frac{1}{2}$ miles. The vessel was found to answer the helm and obey all the necessary movements, such as advancing, stopping, and backing, as well as any steamer upon the usual principle.

On the 2d inst. the Archimedes left her moorings off the Brunswick Dock, and reached Gravesend, a distance of 20 miles, partly with and partly against the tide, in one hour and 45 minutes; on the following day she went from Gravesend to the Nore lights with the tide (22 miles), in one hour and 40 minutes. She then went to Sheerness and exhibited her qualities to all the naval authorities there. She was found to steer with the utmost facility, passing among and round the ships in ordinary with the most perfect command—Admiral Otway steering her himself. From Sheerness she went to Ramsgate at the rate of $8\frac{1}{2}$ knots per hour, on one occasion $9\frac{1}{2}$ knots by Massey's patent log; and although her engines were obliged to be slackened off Margate, on account of the fog, she reached Ramsgate, a distance of 45 miles, in 4 hours and 25 minutes, (upwards of $10\frac{1}{2}$ miles per hour). This was done with the small propeller, which is about 6 feet diameter, and 7 feet 6 inches in length. At Ramsgate the small propeller was taken out, and the large propeller, 7 feet in diameter and 8 feet in length, fixed; and on the 7th inst. we left Ramsgate harbour during a gale from the N. E., and strong tide heavy sea against us, and headed the North Foreland at the rate of from 4 to 5 knots an hour; on rounding the Foreland the sails were hoisted, when the engine immediately quickened her speed, and the rate of the vessel 9 and $9\frac{1}{2}$ knots per hour, and on one occasion with sails 10 knots (upwards of $11\frac{1}{2}$ miles), which, including tide, would give a velocity of distance equal to 14 miles per hour; the measured mile was tried against tide—this was run in $6\frac{1}{2}$ minutes. Reached the moorings off the Brunswick Dock in 4 hours 43 minutes from the Nore. On the 18th inst. the Archimedes proceeded on a second voyage to Portsmouth; she stopped at Gravesend on the same night, and left on the following day for Portsmouth, which she reached in 21 hours, being a distance of nearly 200 miles, and during a heavy gale of wind for the most of the time. On trying Massey's log the average velocity was $8\frac{1}{2}$ knots, or 10 miles nearly. On her arrival at Portsmouth she was visited by all the naval authorities, both scientific and unscientific, and there appeared to prevail but one opinion as to the efficiency of the principle for naval warfare. By this arrangement the engines are completely protected from shot by the coal boxes on either side, whilst the propeller, from being wholly immersed under water, is out of the reach of shot. The tunnel is the most vulnerable point, but it might easily be replaced in case of accident, by having a spare funnel below, constructed on the telescope

principle, by which means it would occupy little room, and be always at hand to replace the other. I might enter into details, but I think I have said enough to convince you that as a first experiment it has been most successful, and has exceeded the most sanguine expectation.

I remain, dear Sir, your obedient servant,

John Herapath, Esq. &c., &c., GEORGE RENNIE.
Railway Magazine and Steam Navigation Journal.

[Expectation of the success of this experiment was at a very low ebb. Our readers, therefore, will, we are sure, be glad to have an account of it on such an authority as that of Mr. Rennie, who sailed in the vessel each trip. Mr. R. has forgotten to mention one or two important points, that we have heard on very good authority. If the screw was turning in a solid material it is evident the vessel must advance for each rotation of the screw, which consists but of one turn, exactly its length. From the yielding nature of water, however, great loss may be expected; but we understand with 120 turns a minute the loss is only one-sixth.

The engines, screw, and the whole of the machinery were made at Messrs. G. and J. Rennie's manufactory.—
 ED.]

Midland Counties Railway.

As the portion of this line from Nottingham to Derby opens on the 4th of June, we have procured the following brief account of the line and works from the best authority:—

The part of this line which connects the towns of Nottingham and Derby is $15\frac{1}{2}$ miles in length. The district is generally favourable for railway operations, especially for several miles from Nottingham.

The total quantity of earthwork upon it is 545,000 cubic yards, the deepest cutting being 30 feet, and the highest embankment under 20 feet; a great portion of the line is embanked, in one part for 3 miles continuously, which has made the operation of forming somewhat tedious. The ground was first broken on the 23d May, 1837. The principal works (excepting earthwork) are two considerable diversions of the Derby Canal, at one of which a new lock had to be built. The Erewash Canal, also an arm of the Trent navigation, had to be crossed by bridges, both of which are of iron.

There are sixteen other bridges on this part of the line. Nearly 14 miles of the permanent way are laid on stone blocks, each block containing 5 cubic feet, all of the Derby-

shire mill-stone grit; the remainder is on transverse sleepers of larch timber Kyanized. The whole of the rails are 77lbs. to the yard, the heaviest and strongest in section of any hitherto used. The joint chairs are upwards of 28lbs. each, the intermediate ones 23lbs. each. The rails are secured in the chairs by compressed oak keys, being the simplest, and at the same time the most effectual method in use. The distance or length of bearing where blocks are used is 5 feet, and where sleepers are adopted, 3 feet 9 inches. The gradients on the whole Midland Counties line are very good, as the table shows.

The rate of travelling for the present is intended to be 24 miles per hour, including the time occupied by stoppages at four intermediate stations, viz., Beeston, Long Eaton, Breaston, and Borrowash, at each of which a large local traffic is confidently expected (they being situated in very populous districts), independently of that at the termini, which must necessarily be large, Nottingham having a population of upwards of 70,000, and Derby nearly 30,000. The fares will be, 4s. per first class, and 2s. 6d. per second class.

The cost of construction will be about 13,340*l.* per mile, including land, permanent way, also the Nottingham and intermediate stations.

The formation, including bridges, has cost	83,000
Permanent way, 15½ miles, 5,500 <i>l.</i> per m.	82,250
Land, 140 acres, average 180 <i>l.</i> per acre	25,200
Ditto, 10 acres, for stations	8,500

Total	<u>£206,950</u>
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The railway was laid out by, and the Act of Parliament obtained under the directions of, Charles Vignoles, Esq.; the works have been executed under the directions and immediate superintendence of Thos. J. Woodhouse, Esq.

The remainder of the works on the line are in active progress; about 20 miles in addition to the above will be opened early in the spring of 1840, and the entire line to Rugby, forming a junction with the London and Birmingham line, early in the summer of the said year.

List of the Gradients on the Midland Counties Railway, commencing at Rugby:—

		M.	F.	C.
Level	for	0	4	0
Rise, 1 in 330, or 16 feet per mile		5	1	0
Fall, 1 in 440, or 12 ditto ditto		2	2	0

Fall, 1 in 400, or 13 feet 2 inches per mile	. 11	6	0
Fall, 1 in 500, or 10 feet 6 inches per mile	. 0	3	0
Level	. 0	4	0
Fall, 1 in 500, or 10 feet 6 inches per mile	. 2	2	0
Level	. 1	2	5
Fall, 1 in 500, or 10 feet 6 inches per mile	. 0	5	0
Level	. 2	5	0
Fall, 1 in 500, or 10 feet 6 inches per mile	. 5	1	5
Level	. 0	5	0
Rise, 1 in 1,320, or 4 feet per mile	. 1	2	3½
Level	. 1	0	0
Rise, 1 in 880, or 6 feet per mile	. 0	4	0
Level	. 0	5	0
Fall, 1 in 500, or 10 feet 6 inches per mile	. 2	4	0
Level	. 1	1	0

From Rugby to the Cranfleet Cut at the Trent 40 1 3½

Nottingham Curve.

Fall, 1 in 416, or 12 feet 8 in. per mile, for 1 0 8

Derby Curve.

Rise, 1 in 1,370, or 3 feet 10 in. per mile . 1 0 3

From Nottingham to Derby.

Fall, 1 in 528, or 10 feet per mile	. 2	1	0
Level	. 0	4	0
Fall, 1 in 528, or 10 feet per mile	. 1	0	0
Fall, 1 in 880, or 6 feet per mile	. 4	3	0
Fall, 1 in 330, or 16 feet per mile	. 1	0	0
Level	. 0	7	5
Fall, 1 in 1,060, or 5 feet per mile	. 1	0	0
Level	. 2	4	0
Rise, 1 in 880, or 6 feet per mile	. 0	5	5
Fall, 1 in 528, or 10 feet per mile	. 0	7	0
Level	. 0	4	4

Total length from Nottingham to Derby . 15 4 4

Abstract of Distances.

	M.	F.	C.
From Rugby to the curves	. 40	1	3½
Derby curve	. 1	0	3
From end of curve to Derby	. 8	0	0
Total distance from Rugby to Derby			
Derby			49 1 6½
From Rugby to the curves	. 40	1	3½
Nottingham curve	. 1	0	8½
From end of curve to Nottingham	. 6	0	7
Total distance from Rugby to Nottingham			47 2 9
From Derby to Nottingham	. 15	4	4

REPORTS.

NORTHERN AND EASTERN RAILWAY.

REPORT.—The Directors of the Northern and Eastern Railway regard it as their first duty, upon the present occasion, to thank the Proprietors for the proof which they gave of their confidence in the direction, by allowing the Half-yearly Report to be postponed for nearly a month beyond the time fixed by the Act.

The necessity of this delay was obvious. It was impossible to submit to the Proprietors any clear statement of their financial position, or any well-defined plan for their future proceedings, until the fate of the Shares submitted for forfeiture was decided; and as this depended upon the parties interested, in whose power it was to relieve themselves from the impending penalty, by paying up the arrears due to the Company, at any time before the confirmation of the forfeiture by the Special Meeting of the 12th inst., the Proprietors will allow that, in taking only one week for their Report, after the decision of that Meeting was known, the Directors have shown all the promptitude, that was compatible with a due consideration of the new circumstances in which the Company is placed.

It may, perhaps, be regarded as not within the province of this Report, to attempt to account for the secession of so many of the original Proprietors, who have allowed their Shares to be forfeited; but the Directors think it right to express their conviction that it arises rather from the amount of Capital already absorbed by other enterprises of a similar nature, in all of which the Calls upon the Proprietary become heavier in proportion as the works advance, than from any well-grounded doubts as to the practicability and advantages of the Northern and Eastern line.

Be this as it may, the number of Shares forfeited in consequence of the non-payment of Calls, at the Meeting of the 12th inst., was 4,986, leaving a Registered Proprietary of 5,128 Shares, upon which 15*l.* have been paid.

As the re-issuing of the forfeited Shares is a matter of much delicacy, and requiring great caution, it is with reference to these 5,128 existing Shareholders, and with a view to their interest, that the present propositions of the Directors will be more especially made.

In the first place then, it must be admitted, that to attempt, with a capital of 512,800*l.*, represented by the present Share-list, the completion of an undertaking requiring 1,000,000*l.* would be most impolitic. The obvious disparity between the means and the end, and the consequent necessity of adding to the Capital of the Company by the re-issuing of Shares upon the most onerous terms, would cloud all its prospects, as has proved to be the case with many other Companies which have adopted a similar course; while if, on the other hand, the means and the end be made strictly to correspond,—if it can be shown that the means are ample, and the end good,—the Directors see every reason to believe that the undertaking, within its reduced limits, will speedily acquire that estimation, which, from its intrinsic merits, it may justly claim.

With these views, they have unanimously resolved to recommend to the Proprietors to authorize them to abandon, for the present, all idea of carrying the line beyond Bishop's Stortford, to which place they should wish to limit their application to Parliament for additional powers in the purchase of land.

The advantages of this course in the opinion of the Directors, are these:—

1. The estimated expense of the line to Bishop's Stortford, from the point of junction with the Eastern Counties Railway, at Angel-lane, is 480,000*l.*, while the registered Capital of the Company is 512,800*l.*, thus allowing a considerable margin for all the expenses necessarily incidental to the abandonment of one terminus and the adoption of another, and that without reckoning upon any re-issue of Shares.

2. All the heaviest expenses of the line between London and Cambridge begin north of Bishop's Stortford, while as you advance towards Cambridge, the population and traffic unquestionably decrease. The Traffic Tables, to which the Directors advert more at large elsewhere, show a higher per centage upon the Capital invested at Bishop's Stortford, than at any other point.

3. The Company has received little or no support beyond Bishop's Stortford.

It is under no contracts, which are not contingent upon the taking of the land ; and should it hereafter be found expedient to apply to Parliament for another Bill to carry on the Railway to Cambridge, there is no reason to suppose that the Company could, by possibility, be placed in a *worse* position than it is now, while it is probable that there would be a far greater disposition on the part of landowners to facilitate the undertaking, when the advantages of Railway communication, as far as Bishop's Stortford, have been seen and felt.

Upon all these grounds, the Directors recommend the Proprietors at once to come to a determination to confine the undertaking at present to Bishop's Stortford, by which means it appears to the Directors that they will ensure the vigorous prosecution and rapid completion of their works.

In accordance with the provisions of the Act, the Directors have to submit a Balance Sheet of the accounts of the Company, brought up to 1st January, 1839. Since that period, however, as stated above, the number of Shares on which 15*l*. has been paid, has increased to 5,128.

<i>Dr.</i>		£.	s.	d.
To Capital Stock.				
Deposit on	10,569 Shares	31,707	0	0
First Call on	7,252 „	21,756	0	0
Second „	6,343 „	12,686	0	0
Third „	4,626 „	9,252	0	0
Fourth „	3,964 „	19,820	0	0
Interest		152	1	11
Profit on Exchequer Bills		15	11	3
Received in advance of Calls from Proprietors		283	17	0
Loan from Bankers		15,000	0	0
		110,672	10	2

<i>Cr.</i>		£.	s.	d.
Expenses preliminary to and in obtaining Act of Parliament				
Land and Compensation		36,475	18	6
Contractors' Work		32,019	2	6
Engineering		9700	0	0
Agents and Surveyors		5,598	13	6
Office, Salaries, and Miscellaneous Expenses		4,722	5	9
Legal Expenses		4,407	18	6
Direction		2,971	11	0
Balance at Bankers		2,700	0	0
		12,077	0	5
		110,672	10	2

Since the month of August, 1838, the Directors have had every reason to be satisfied with the progress of the works between Tottenham and Broxbourne, as will appear by the following Report of the Engineers of the Company :—

“ *Great George-street, March 19, 1839.*

“ Gentlemen,—The progress and present state of the engineering works upon the line of the Northern and Eastern Railway, will be better understood by a reference to their commencement.

“ The first advertisement for a contract north of Tottenham, including the forming and graveling of eleven and a quarter miles of the line, with bridges and culverts, commencing at Tottenham-hall (the road leading from Tottenham High-cross to Tottenham Mills), and extending to Broxbourne in Hertfordshire. This work was let to Mr. David M'Intosh, was begun in March 1838, and has continued without interruption, excepting such as was caused by possession of the land not being obtained. We have now possession of the whole, excepting about a third of a mile in length. Eight miles are formed, and about three are in hand. The whole length is virtually straight and level, the only inclination being 1 in 528 for half a mile. The strata have turned out very favourable, affording good gravel out of the excavation of the ditches for ballasting the

line. The culverts and bridges are all finished, or in an advanced state. But little has been done in ballasting: we preferred that this part of the work should be deferred until the forming had had the advantage of getting consolidated during the winter. So soon as the weather will permit, the ballasting will now be proceeded in without interruption. From the amount of Mr. M'Intosh's contract, and from any calculation we can as yet make, we do not expect the engineering department of this work to exceed the original estimate of it.

"A Specification has been prepared for forming and ballasting the line between Broxbourne and Roydon, three miles in length, in which is contained the embanking to cross the valley of the river Lea, and of the river Stort, nearly the deepest and most expensive upon the whole line between Stratford and Bishop's Stortford. We expect, in a very short time—say not more than two weeks—to be able to report our opinion of the Tenders for that work, when it may be commenced forthwith.

"The detailed Survey and Sections up from Roydon through Harlow, to Bishop's Stortford, (ten and a half miles) are completed, to enable the purchases to the above extent to be made.

"When the deviation to join the Eastern Counties Railway is made, the lengths above referred to are as follows:—

Bishop's Stortford to Roydon	10½ miles.
Roydon to Broxbourne	3
Broxbourne to Tottenham	11½
Tottenham to the Eastern Counties, Stratford . .	4½
Stratford to Shoreditch upon the Eastern Counties	3½

Total 32½

"We are, Gentlemen, your most obedient servants,

"WALKER AND BURGESS.

"To the Directors of the Northern and Eastern Railway Company."

The Directors feeling that nothing was so essential to the interests of the Company under its present circumstances, as to obtain possession, if possible, of the junction line, by which their union with the Eastern Counties is to be effected, without the loss of the whole year in notices, which must have been the case had the Standing Orders of the House of Commons been literally complied with, have made every effort to accomplish this, as a very short recapitulation of what has been done will show.

The Proprietors are aware that the deviation line exceeds four miles in length while the Standing Orders allow of no deviation exceeding one mile, without the same notices that are required for a new line. But the Directors saw ground to hope that in a *bona fide* enterprise, where large interests were at stake, a mere technical objection of this kind would not be allowed to outweigh considerations of public convenience and expediency, such as the saving of capital, and the non-interference with property in the vicinity of town, by the consolidation for three miles of two lines, on their entrance into the metropolis, provided it could be shown that every regard had been evinced for private rights, and that there was no opposition to the measure by any of the parties more immediately concerned.

The Directors have the satisfaction of adding that on the 12th of March they were able to state to the Committee on Petitions that they had contracted for the whole of the land and buildings required for the junction line; and, when they inform the Shareholders, that after the completion of the surveys, this task was accomplished within the estimate, and within the time, they can give no better proof to them of the zeal with which they had been served.

The decision of the Committee will not be known until to-morrow,* when the case of the Northern and Eastern Railway stands first upon the list. Should the Directors be allowed to proceed with their Bill, which they see reason to hope, they would propose to apply the whole strength of the Company to the junction line, and to the works between Broxbourne and Roydon, to which place the line might then be opened in the year 1840. Should, on the other

* Since this Report was made the Committee on Standing Orders have allowed the Company to proceed with their Bill for the deviation line this Session.

hand, the Standing Orders be rigidly enforced, and the Bill postponed for another Session, in lieu of opening any portion of the line in 1840, the works upon the whole line between Broxbourne and Bishop's Stortford might be brought into such a state of forwardness as to ensure their completion simultaneously with the junction line in 1841.

The Directors have alluded elsewhere to the fact, that all their calculations as to traffic present a more favourable result for a line stopping at Bishop's Stortford, than at any other point. In order to ensure the best data in a matter of so much importance, they have caused the traffic to be again taken by a gentleman of much experience, Mr. Richard Till, without any reference to the tables prepared for Parliament by their own officers in 1836; and it is with great gratification that they now inform the Proprietors that, in almost every instance, the results correspond.

The total number of passengers per year, as given by the	
Company's tables, was	1,025,650
By Mr. Till	1,038,438
<hr/>	
Passengers' revenue by the Company	£146,647
By Mr. Till	134,029
<hr/>	
Goods' revenue by the Company	14,641
By Mr. Till	20,332
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Total by Company	174,196
Total by Mr. Till	162,983
<hr/>	

Mr. Till having allowed nothing for the conveyance of mails, nothing for agricultural produce or live stock, and nothing for the possible competition in the conveyance of certain articles with the rivers Stort and Lea, these items more than cover the small difference that now appears. But even without these Mr. Till, after deducting from the gross revenue 57,181*l.* 6*s.* for maintenance of way, locomotive power, and management, and 24,310*l.* for rent and tollage to the Eastern Counties Railway (the tollage being calculated upon an estimate of 19,974 passengers weekly), leaves to the Company a net income of 81,491*l.* 16*s.*, which upon an expenditure of 480,000*l.* would give a return of nearly 17 per cent.

The Directors think themselves fairly entitled to congratulate the Shareholders upon this prospect, and upon the comparatively short time that will be required to test the soundness of the views thus held out. They see no reason themselves to doubt the accuracy of the data upon which Mr. Till's estimate is founded, or to think that there is any exaggeration in the result; and, as they have already stated, if properly supported by the Shareholders, they will undertake to open the whole line to Bishop's Stortford in the year 1841. This cannot of course be accomplished without regular demands upon all the existing Shares; but if the Proprietors should deem it advisable to re-issue all, or any, of the forfeited Shares, it is evident that to whatever extent this may be done, it will have the effect of diminishing the Calls from 100*l.* to 70*l.*, 60*l.*, or even 50*l.* upon the Shares now registered; while, if none of the forfeited Shares be sold, it is equally clear that the money already received upon them, amounting to 26,554*l.* will have served to defray three-fourths of the preliminary expenses of the Company, of which the actual Shareholders will enjoy the fruits.

With regard to the future disposal of these Shares, the Directors beg to state they can do nothing without taking power in the first instance from the Proprietors, at a Special Meeting, of which ten days' notice must be given; so that there will be ample time for weighing in every instance the effect of whatever may be proposed upon the interests of all concerned.

Consistently with the reduced extent of the undertaking, recommended in this Report, the Directors beg to state that it is their intention to take the necessary steps for reducing the number of the Directors, and the general charges connected with the management of the works.

61, Moorgate-street, March 19, 1839.

H. G. WARD, *Chairman.*

NORTHERN AND EASTERN RAILWAY, LONDON TO CAMBRIDGE.

ESTIMATE of the ANNUAL INCOME from PASSENGERS and GOODS on this Railway, when completed to Bishop's Stortford (32½ Miles). BY Mr. RICHARD TILL, Guildhall Buildings, London. From Data minutely taken during February, 1839.

COACHES TO AND FROM LONDON AND THE FOLLOWING PLACES.	STATIONS AT WHICH THE PASSENGERS WILL TAKE OR LEAVE THE RAILWAY.	Number of Coaches Licensed by Stamp Office.	Journeys per Week Licensed.	Number of Passengers each Journey Licensed.	Average Number of Passengers each Journey. 3 Inside. 6 Outside. 5 Malls.	Increase Number of Passengers by Railway.	Fares for each Passenger. Average for 1st Class, & 2d Class, & Open Carriages.	RAILWAY RECEIPT PER WEEK.	ANNUAL INCOME.
								£. s. d.	£. s. d.
Fakenham	These Coaches now travel the Ware or Bishop's Stortford roads, and will take the Railway at Bishop's Stortford, to save Thirty Miles of Turnpike Road.	2	14	12	126	Nil			
Wells. Mail		2	14	7	70	"			
Holbeach. Mail		2	14	7	70	"			
Wisbeach		2	14	15	126	"			
Lynn		2	14	12	126	"			
Cambridge		10	68	3 at 9 } 7 at 15 }	612	"			
Norwich. Mail		2	14	7	70	"			
Norwich, and } Newmarket		4	28	12	252	"			
Bishop's Stortford		1	12	15	1,452	. . . .	at 5s.	363 0 0	
Dunmow	Hockerill	1	12	15	108	324			
Saffron Walden	Ditto	1	12	15	108	324	at 5s.	175 10 0	
Harlow . . . . .	. . . . .	1	2	15	18	54			
Epping	Waltham	1	12	12	108	324	at 4s. 6d.	72 18 0	
Ware	Hoddesdon	1	14	18	126	378	at 1s. 6d.	28 7 0	
Hertford	Ditto	2	26	15	234	702			
Hoddesdon . . . . .	. . . . .	5	64	52 at 15 } 12 at 18 }	576	1,728	at 2s. 6d.	533 5 0	
Broxbourne . . . . .	. . . . .	1	12	12	108	324			
Cheahunt . . . . .	. . . . .	2	56	15	504	1,512			
Waltham Abbey . . . . .	. . . . .	2	70	42 at 15 } 28 at 18 }	630	1,260	at 1s. 6d.	191 14 0	
Waltham Cross . . . . .	. . . . .	1	16	15	144	288			
Enfield . . . . .	. . . . .	2	56	12	504	1,008			
Edmonton . . . . .	. . . . .	6	170	24 at 9 } 146 at 15 }	1,530	3,000	at 1s. 3d.	191 5 0	
		19	804	15	7,230	Nil	at 1s.	361 16 0	

Putting and Private Carriages.

There are twelve pair of post horses kept at Hookerill, and ten pair at Ware, averaging twelve turns a day each road ; it is found by experience, on other Railways, that this branch of revenue equals the previous receipts on the turnpike roads. I have taken the amount at one-third less.

378 0 0

Passengers

By g'igs, taxed carts, and horsemen ; average 250 a day, for twenty miles, at 3s. each, is

262 10 0

Parcels

Average twelve each journey by day coaches, and twenty-four by night coaches, under 10lbs. weight, at 1s. each

185 0 0

Goods

There are at present forty-six waggons and vans through Bishop's Stortford to London, from Cambridgeshire, Lincolnshire, and the western part of Norfolk, with agricultural produce to London, and with grocery, dry goods, and shop goods, from London ; the charge to Bishop's Stortford is now 20s. a ton ; these waggons carry, on an average, nine tons the double journey, or 850 tons weekly ; three-fourths of these would be forwarded by Railway, with a proper arrangement with the present carriers : say—

638 tons at 7s. 6d. }
And about 128 tons from Harlow and Sawbridgeworth at 6s.

277 13 0

There are also twenty-five waggons through Hoddeston, from the same line of country, making ninety-six journeys weekly, and carrying 864 tons the double journey ; say three-fourths of these are 648 tons, at 3s. 6d. a ton, is

113 8 0

£ 1,216 11 0

63,260 12 0

INCOME

£ 162,983 12 0

Deduct annual charge for maintenance of way, millage duty, locomotive power, police, salaries, management, annual rent of station and tollage to the Eastern Counties Railway

£ 81,491 16 0

NET INCOME

£ 81,491 16 0

Traffic not included in the above Estimate, but which may be fairly calculated upon.

1. The passengers by the Tottenham coaches are not included in this account ; they exceed 2,000 weekly.
2. The Estimates of the income arising from the carriage of goods is exclusive of the farmers' carts, with hay, straw, and produce, up to the London market, and returning with manure.
3. No part of the traffic on the rivers Lea and Stort, which amounts to 250,000 tons annually, chiefly malt and coal, at a charge of 12s. a ton for malt, and 8s. a ton for coal, is included in this account.
4. The carriage of live cattle is excluded.
5. The foregoing Estimate does *not* assume any increase in the number of passengers on the long coaches now running to points north of Bishop's Stortford.
6. Nor is any increase whatever estimated on the Edmonton traffic.
7. The carriage of mails is excluded.
8. There is no doubt that a very considerable income will be derived from what may be called holiday passengers on this line; the London terminus is in the centre of a very dense population, and the part of the country through which the line passes has always been a favourite resort for the people residing in that part of the town ; but as no data could be obtained whereby to form a correct estimate of this traffic, it is not enumerated in the sources of income.

Estimate for completion of Railway, from its Junction with the Eastern Counties to Bishop's Stortford, including all incidental expenses, 480,000*l*.

Net income, as above, 81,491*l*. 16s., being nearly 17 per cent.

SOUTH-EASTERN RAILWAY.

Fifth Half-yearly Meeting held at the offices of the Company, No. 10, Coleman-street, London, Wednesday, the 8th day of May, 1839; THOMAS W. TYNDALE, Esq., in the chair.

REPORT.—The directors beg to lay their fifth half-yearly report before the proprietors, and in doing so, in the first place, to call their attention to the report made to the meeting of proprietors held in November last. The state and progress of the works up to that time were therein detailed. Since then all the works have continued to advance in a highly satisfactory manner. Two additional contracts have been taken, viz., one for the concrete wall and filling to connect the Western end of the Shakspeare tunnel with the eastern end of the Abbott's Cliff tunnel ; and the other for the works from the western side of the Tunbridge Wells road, at Tunbridge, to Penshurst. Both these latter works have been commenced, and are now in a course of execution. Besides these contracts, others have been entered into for the excavation of shafts and galleries at Abbott's Cliff and Folkestone, for the formation of the tunnel at the former place, and the bridge and earth-work at the latter. These preparatory works are now near completion ; so that at a very early period from this time, the directors will be ready to offer these and the Beachborough works also for contract. This being done, every work of any magnitude on the present Parliamentary line will be actually in hand.

Since the last half-yearly meeting, further portions of the land required for the railway have been purchased and paid for, and the directors are now in treaty for the whole of the residue ; upwards of forty miles being under contract.

Referring to the suggestion made at the special general meeting of pro-

prietors held on the 5th of March last, by which a desire was expressed that an arrangement should be made for settling the questions between this company and the London and Brighton Railway Company, the directors have the satisfaction of stating that such an arrangement has been made, and terms have been settled (subject to the sanction of this meeting), which it is believed will be highly beneficial to both companies. The effect of the agreement is as follows:—That when the Brighton Company shall have completed that portion of their line which lies between the Croydon Railway and a point near Earlswood-common, at which the South-Eastern line shall join the Brighton line, the Brighton Company shall sell to the South-Eastern Company, at cost price, with interest on the outlay, the lower or southern half of such portion; which half, when so sold, shall become the property for all purposes of the South-Eastern Company: but that each of the companies shall have the privilege of passing over the portion of the line between the points above stated without paying any toll to the other.

The advantages to each company by this arrangement, by which one-half of the cost of an expensive portion of the line is effected to each, are obvious; and the arrangement is calculated to promote that good understanding between the two bodies which is so essential to the prosperity of both.

The agreement in which the terms above stated are incorporated, will be laid before the meeting, and submitted to the proprietors for confirmation.

A Bill is now before Parliament to enable this company to effect a junction with the Brighton Railway at Redstone Hill, and to carry the arrangement with that company into complete effect. This Bill will be submitted to a special meeting of the proprietors convened for that purpose this day.

Immediately on obtaining the requisite powers under this Act, it is the intention of the Directors to press forward the works westward from Penhurst, so as to effect the junction with the Brighton line at the earliest possible time, and it is expected that the South-Eastern line as far as Tunbridge, will be opened simultaneously with the Brighton line to the point of junction.

The directors think it right to state, that there are 4,367 shares on which the call of 2*l.* per share, due on the 20th of August last, still remains unpaid, and on a portion of these shares, notice of forfeiture has been given to the parties in default.

The resolutions of the special general meeting held on the 5th of March last, as to the disposal of the shares in the hands of the company, have been carried out so far as consistently with the provisions of the Act of Parliament they could be complied with, and the directors have the satisfaction to state, that the registered shares now amount to 26,173.

The deficiency in the register, which is 1,827 shares, arises from the difficulty of dealing with that class of shares which were forfeited by the resolution of the general meeting in November, 1838. This difficulty is still under the consideration of the directors.

The state of the accounts up to the 30th of April last, will be seen by the balance-sheet annexed to the report, from which it appears that a balance of 30,477*l.* 12*s.* 8*d.* remains at the disposal of the company.

Pursuant to the provisions of the Act of Incorporation, the directors have decided, by ballot among themselves, the members to retire from the board, and they have to report that Mr. Baxendale, Mr. Borradaile, and Mr. Mills, have been balloted out; and that, being eligible, they have offered themselves to the proprietors for re-election.

London, May 8, 1839.

T. W. TYNDALE, *Chairman.*

Statement of Receipts and Expenditure, presented to the Half-Yearly General Meeting of Proprietors, 8th May, 1839.

RECEIPTS.		£.	s.	d.
Amount received on account of capital to 1st May, 1839		166,462	0	0
Ditto for interest		2,657	11	7
Ditto from South-Eastern Brighton Railway Company		1,500	0	0
Ditto for rents		45	0	0
		4,202	11	7
		£170,664	11	7

	EXPENDITURE.			To			Total		
	Per Account to 30 Nov. 1838.			1st May, 1839.			Amount.		
	£.	s.	d.	£.	s.	d.	£.	s.	d.
Expenses incurred previous to the formation of the company	1,422	7	2	....			1,422	7	2
Advertisements, maps, engravings, general printing, and stationery	3,425	9	7	517	11	1	3,943	0	8
Parliamentary printing	1,363	18	0	....			1,363	18	0
Engineering, surveying, valuation of land, and professional witnesses in Parliament	22,799	8	10	3,428	19	3	26,228	8	1
Works	5,600	11	8	7,506	19	6	13,107	11	2
Land and compensation	28,308	12	4	10,809	14	6	39,118	6	10
Parliamentary fees and agents' bills	3,387	12	3	....			3,387	12	3
Solicitors' bills, including conveyancing, fees to counsel, books of reference, canvassing, bills of country solicitors and agents, and witnesses in Parliament	33,498	4	9	2,845	6	9	36,343	11	6
Expenses of deputation along the line, and to Paris and Brussels	411	5	2	....			411	5	2
Direction	2,200	0	0	150	0	0	2,350	0	0
Office expenses, including payments to secretary and clerks, rent, taxes, expenses of taking traffic, furniture, repairs, postages, travelling and incidental expenses	8,601	10	6	939	7	7	9,540	18	1
Advanced to the South-Eastern Canterbury Railway Company, to be repaid by that company				3,000	0	0	3,000	0	0
	£111,019	0	3	29,197	18	8	140,216	18	11
Balance in hand	£30,447	12s.	8d.						

GREAT WESTERN STEAM-SHIP COMPANY,

Established by Deed of Settlement, dated June, 1836.

At the Annual General Meeting of the Proprietors, held at the Company's Office, Bristol, on Thursday, 7th March, 1839; PETER MAZE, Esq., in the Chair; the following report of the Board of Directors was read:—

THE last report which your directors had the pleasure of laying before you contained a detail of their proceedings preparatory to the first voyage of the "Great Western." They now meet you at the termination of the year to which they then looked forward as affording the practical test of your undertaking, and they have to congratulate you on its entire success.

Your first ship has disproved all unfavourable auguries, and has rewarded your enterprise with great repute, and an encouraging return upon your capital has firmly established your line, and laid the foundation of its increased prosperity.

In working out this result your directors have experienced anxieties of the gravest description, arising from the novelty of the undertaking itself, the before untried scale of passenger accommodation involved in it, the variety of departments which the business of the ship has embraced, and the very short periods to which her stay in port has been limited.

It has only been by the greatest exertions on the part of the executive that they have been enabled to surmount these difficulties, and they feel bound particularly to allude to Mr. Guppy and Mr. Claxton, the latter of whom, whilst filling the office of managing director, and since his resignation of that office, has, late and early during those hours which have not been occupied by his public duties, devoted himself to your service in a degree beyond all precedent.

Their warmest acknowledgments are due to Mr. J. K. Brunel, for a continued and deep interest in your undertaking, by which the same eminent science is ensured in aid of its progress, which was the ground-work of its first success.

Of the services of Captain Hosken, whose appointment to the command of the "Great Western" was announced in their last report, your directors cannot speak too highly. He has nobly sustained the reputation won by the first achievement of regular and continued Transatlantic Steam Navigation, and the high testimonials of his passengers attest the general esteem in which he is held.

They have the gratification to report that their experience justifies their most sanguine expectations of the benefit arising to your service, and to steam navigation generally, from the introduction of young gentlemen into your employ as cadets.

Of your ship it is impossible to report too favourably. Her qualities as a sea-boat are of the highest class, and after having run 35,000 nautical miles, and encountered the heaviest weather, her seams require no caulking, and she has not even strained herself so as to show a wrinkle in her copper when she was docked. This is a source of the greatest gratification to your directors, because it justifies the course pursued in adopting the strongest possible modes of construction.

Experience has gradually suggested many alterations and improvements conducive to the comfort of passengers, some of which could not be ascertained till the passages had been made with the largest number which she was capable of carrying, and others which were suggested only by the experience of her winter voyages. Your directors have not hesitated to make them in as efficient a manner as time and circumstances would permit, and their increasing endeavours will be directed towards every

means of preserving to your line the patronage to which it is so deeply indebted on both sides of the Atlantic.

Your directors cannot sufficiently express their sense of the great kindness with which your enterprise was received in the United States. To the authorities and the people of that country they are indebted for every possible facility and the most friendly support, and no exertion which your company can make can repay the public consideration, and the warmth of private feeling with which your undertaking has there been favoured.

In no department has more difficulty been encountered than in that of the steward, arising from an under estimate of the space required for the conduct of its various branches, and from the novelty of preparations on ship-board of unequalled extent and variety. By degrees they have, they believe, however, met every difficulty, and they are sanguine in the expectation that general satisfaction has now been secured.

Since her first departure from Kingroad on the 8th of April, 1838, the "Great Western" has performed five complete voyages to and from New York, and may be expected in a few days on her sixth return. The average of her passages out has been 15 days and 19 hours, the shortest out having been 14 days and a-half; and the average home 13 days 6 hours, the shortest having been 12 days and a-half. She has carried nine hundred and ninety-seven passengers, and about one thousand tons of goods.

At the conclusion of the fifth voyage, the directors deemed it advisable to put her into dock, in order to overhaul the vessel and her engines, and on application to the Lords of the Admiralty, they were cheerfully granted the use of Her Majesty's dock-yard at Pater, for that purpose. She was there ready for the highest spring-tide on the 20th December, but the springs being too low to admit her, she was detained at Pater an additional fortnight, and her first voyage of the year thrown out by that time. The directors seize this opportunity of expressing in your behalf their deep sense of obligation to the Lords of the Admiralty, to Captain Superintendent Jackson, C.B., R.N., Mr. Edye, and the other officers of that establishment, by whose zealous kindness the liberal views of their Lordships were carried out in the most beneficial manner to your company.

Your directors regret to say that a heavy charge has arisen in consequence of a portion of the goods, taken on board at the last moment of her sailing on her fifth voyage, having been damaged by exposure on deck, during the heavy weather she encountered almost immediately after her departure. After an anxious investigation of the circumstances, your directors find no cause to throw blame on the executive officers of the company for the unfortunate occurrence. To meet the loss, the sum of 1,500*l.* is carried off, and nearly the whole of the claims of the company being settled by the very zealous arrangement of your agent, Mr. Richard Irvin, of New York, this provision is deemed ample.

The loss on the first or experimental voyage has been followed by receipts fully equalling the hopes of your directors, on this the first season of your great experiment; and they have great pleasure in acquainting you that there is every appearance of the ship again filling with passengers and goods on her next outset. On every outward voyage they have been compelled to resist very pressing entreaties for room for goods, and not only does this afford a most satisfactory prospect to the company, but they have the pleasure of believing that the new facilities afforded to mercantile transactions, by the rapid communication through your vessel, have powerfully tended to increase the shipments by the sailing lines.

If, however, on the one hand the experience of receipts has equalled the expectations of your directors, they have on the other been taught

that the expenses of the service by which those receipts are earned are of the most serious description. To accomplish the mere passage across the Atlantic in a powerful vessel is simple ; but to combine in its performance speed, security, and enjoyment, requires a perfection which can only be obtained by an outlay which must long tend to confine steam operations to a few great streams of passenger-traffic and to largely-invested capital.

To the cost of fuel your directors have most anxiously looked, as to the means of effecting economy. The experiments which they have made do not justify their expectation that any fuel can yet be safely looked to excepting coals ; of this they have taken every means which they could devise to procure supplies on the best footing, in relation to both price and quality.

They have, during the past year, shipped 1,000 tons to the company's agent at New York, from Swansea and Scotland, and sheds are erected in your yard there for its protection. They have reason to believe that the Congress of the United States will soon pass a bill, having for its object the release of coal sent out for the purpose of steam navigation from a heavy duty of two-pence per bushel, and they are not without hope of its having a retrospective effect.

Your directors have to lament an extraordinary addition to expenditure, caused by the necessity of the port service of your ship being carried on many miles from Bristol.

They are justified in saying that this circumstance has more than doubled the disbursements whilst here, in addition to which they have been compelled to lay down moorings in the river, at the expense of 360*l*.

For the reimbursement of this necessary outlay they look to the justice of the public bodies of your port.

A published correspondence between your directors and the Dock Board will have possessed you of a discussion which has arisen on the subject of dock dues, amounting on the voyages hitherto performed by the "Great Western" to 510*l*.

After having returned the dues levied on the first voyage, and abandoned them prospectively, "until," in the words of a resolution of the 2d July, 1838, conveyed from the Dock Board to your directors, "suitable accommodation be provided for her ;" your directors regret to say that the Dock Board having taken a legal opinion, the Dock Board considers itself bound again to claim that which it had from a sense of equity, but as it is now assured illegally, conceded. It has frankly communicated the legal opinion above referred to, with the case on which it was taken, to your directors, and these documents are now engaging their anxious consideration.

Your directors had hoped that long before this your second vessel would have been in a state of forwardness, but the same feeling which led to unusual caution in the construction of the "Great Western," an increased conviction that the nearest possible approach to perfection must be kept in view, retarded their conclusions. After, however, the most ample investigation, they finally determined to build your next vessel of iron, and they are now far advanced in their preparation for her construction, which will be carried on under the most skilful superintendence.

The erection of the requisite workshops and machinery is rapidly advancing at your yard, on the banks of the floating harbour, the proportions of the vessel are determined upon, and your directors are availing themselves of the highest professional skill, as well as of their own practical experience, in determining on the vital point of the construction of the engines.

Your directors have removed your office to Princes-street, where they have obtained very convenient premises, comprising accommodation for both the counting-house and the engineer's departments, with space for depositing ship's stores and for housing goods, transmitted to them for forwarding by your vessels.

Your directors lay before you a statement of accounts, made up in conformity with your deed of settlement, to the 31st January last.

In accordance with the provisions of the deed of settlement, your directors have declared a dividend of 5l. per cent., which, with that declared on the 23d August, is equal to 9 per cent. on the year.

Three of your directors, Messrs. Kington, Bright, and Godwin, and one of your auditors, Mr. Charles B. Fripp, retire by ballot, and their names have been put up for re-election.

(Signed)

PETER MAZE, THOMAS KINGTON, CHRISTR. CLAXTON.

SCIENTIFIC AND MISCELLANEOUS INTELLIGENCE.

Artesian Wells.—A very interesting paper on this subject, by Mr. Mylne, the talented engineer of the New River Company, was read, a few evenings since, at the ordinary weekly Meeting of the Institution of Civil Engineers. Our readers are aware that public attention has frequently been directed to the possibility of obtaining a plentiful supply of pure water, by means of the wells, commonly known as Artesian wells, from their having been first adopted in Artois, called by the Romans Artesium. To test the practicability of this method of procuring water in sufficient quantity for the use of the metropolis, the New River Company, at great expense, caused a well to be sunk at their reservoir in the Hampstead-road; and the details of this experiment, accompanied by some valuable information on the subject in general, are contained in Mr. Mylne's paper. London is placed in a large hollow or bowl of chalk, generally termed the "London basin," the super-strata being first sand, and then the deep blue London clay. This geological formation is peculiarly adapted for these wells, and on forcing vertically through the deep stratum of clay into that of sand, water is generally found. This will rise to a height depending, of course, on the elevation of the point at which the sand stratum crops out from under the bed of clay; but it does not seem probable, from the results of the experiment made by the Company, that it will ever be obtained in a sufficient quantity to be made available for general purposes. The *modus operandi* pursued at the well in the Hampstead-road, is stated with great minuteness by Mr. Mylne; and Mr. Simpson, of the West Middlesex Water-works, having also been applied to professionally, has furnished a report on the state of the works at a particular stage of the proceedings, which contains much valuable information. Before, however, entering into these details, Mr. Mylne mentions several curious facts connected with the sinking of wells. In various parts of the metropolis and in other places, it has been found that wells supplied from sand springs are so affected by neighbouring wells, or the subsidence of the upper ground from the large quantities of fine sand pumped out, that they have been necessarily abandoned; and many remarkable instances of danger to buildings from this cause related in the paper, are well worthy our serious attention. Indeed the subject is altogether one of peculiar interest, and we propose, time and space permitting, to prepare a few remarks on it, for our next number, for which also we must reserve the details we have alluded to.

Material for Railway Blocks.—The great expense of the granite blocks

now generally used in the construction of railways, and their liability to fracture from the present mode of driving the pins into them, has directed the attention of scientific men to the desirableness of finding a substitute for this material. It has been considered that a substance to be used for this purpose should possess more *toughness* than granite, equal durability, should be impervious to the action of water, and be obtained at a less cost. Various materials have been suggested at different times, but none, we believe, have established their pretensions sufficiently to supplant good granite blocks in the favour of the eminent engineers of the day. Amongst others, however, who have attempted this, M. D'Harcourt, of Pimlico, submitted to the attention of the Institution of Civil Engineers, at a recent Meeting, a substance which he calls artificial stone or granite, and of which he proposes to make railway blocks. The proprietor claims, for this material, great merit in resisting wet, and he considers it offers peculiar advantages for blocks, as the chair being inserted in the manufacture of the article, and thus becoming, as it were, a component part of the block, all subsequent weakening of it by driving the pins is avoided. The various combinations of asphaltic cement have, also, naturally presented themselves as adapted to this purpose; and the partisans of the numerous asphalt companies (who, we verily believe, conceive this substance applicable to every thing) have strenuously recommended it, not only for blocks, but sleepers, &c., &c. In the course of the conversation, however, which took place at the Meeting we have alluded to, on the merits of M. D'Harcourt's artificial stone, Mr. Rastrick stated that he had about a month ago laid down blocks of the Scotch asphalt, two feet square, and weighing about 3 cwt. 3 qrs., on a portion of the Southampton Railway. The sleeper was put in while the block was formed, and instead of boring a hole for the bolt or pin by which the chair is fastened, he had had it driven at once without boring in the usual manner. He found the asphalt blocks bear this without apparent injury; and, as far as the limited trial they had had would enable him to judge, he thought them likely to answer the purpose extremely well. The cost of blocks of the size we have described we understood to be about 4s., while similar ones of the artificial stone were stated to cost about 6s.

Westminster Sewage.—In the "Railway Magazine" for May (p. 256), we mentioned, in connexion with this important subject, the presentation of Mr. Jones's beautiful and elaborate work to the Institution of Civil Engineers.—At the Meeting of the 7th ult., the short essay which accompanied the drawings was read by the Secretary.

The author commences his paper by a slight sketch of the laws affecting sewage, and gives various extracts from old documents to show the manner in which the extensive powers possessed by the Boards of Sewers, as at present constituted, have been established, the additional legislative enactments since the General Sewage Act of 23d Henry VIII., the bearing of these laws on society, and their evident insufficiency to carry into effect the purposes for which they were intended. From these preliminaries he deduces the necessity of some comprehensive law for the regulation of the sewers of the whole metropolis. In a subsequent part of the paper, the writer touches slightly on the general principles of drainage, as applied to the sewage of towns, points out how little information is to be found in the writings of eminent engineers on this particular branch of the subject, and explains the peculiar difficulties which have prevented the establishment of a perfect system of sewage in the city of Westminster. He then enters into a very minute description of the plan and drawings, explains the courses of the main and collateral sewers, the districts drained by them,

&c., &c., and, finally, he gives a set of ingeniously constructed tables, in which every possible information on the sewers is condensed.

The reading of the paper was several times interrupted by applause, and the President acknowledged the value of the communication in a very handsome manner. We cannot but compliment the Society on the spirit which now characterises its proceedings, and we think the feelings of honourable rivalry among its members, exhibited by such presents as the one we have described, alike honourable to the individuals and the whole body of the Institution.

Stars Missing.—The volume, for 1837, of "Greenwich Observations," contain the following list of stars which have been repeatedly sought for at the Observatory, "but no traces of them are discoverable." In the Astronomical Society's Catalogue, the stars "Nos. 337, 805, and 2460; the stars L and c', observed at Cambridge with Halley's Comet ("Camb. Obs." 1835); and the following stars observed by Sir John Herschel with Halley's Comet ("Ast. Soc. Mem.," vol. x.), A. R. 10h. 12m. 10s., N. P. D. 99° 17'; A. R. 15h. 38m. 31s., N. P. D. 119° 30'; A. R. 15h. 41m. 4s., N. P. D. 119° 16' (?); and A. R. 15h. 42m. 39s., N. P. D. 119° 6'." Thus ten small stars at least, it appears have disappeared within a very few years. No conjectures whatever can be given of these frequent changes in the heavens. Some stars have a periodical change of magnitude varying from 2h. 20m. $\frac{1}{2}$ to 150 or 300 years; many stars have other smaller ones revolving about them; while others keep an equal distance from each other, but change their places in the heavens. For several centuries the theory of the planetary motions occupied the whole attention of mathematical philosophers, and that of the moon was particularly troublesome. During this time it was supposed the fixed stars had no theory at all; but it now appears they have a more complicated one than ever the moon's was, and are likely to find employment for our practical and physical astronomers for many a year to come.

Share Statistics.—In the Birmingham Railway there were in 1837, about 151 persons holding single shares; 279 holding 5 each; 246 holding 10; 83 holding 20; 42 holding 30; 21 holding 40; 20 holding 50; 7 holding 60; 5 holding 70; and 4 holding 80. Certain numbers appear to be much greater favourites with holders than others; as, for example, there were 83 holding 20 to 63, holding 15 each; 21 holding 40 to 9, holding only 35; 20 holding 50 to 6, holding 45; 7 holding 60 to 1, holding 55, &c. In making, therefore, inquiry into the proportion of railway holders, the favourite numbers only ought to be used. Some are immense holders in the concern; as, for instance, one gentleman, a merchant of Liverpool, held 800 whole, and 800 quarter shares, and another, a merchant of Manchester 900 of each. Had interest been allowed, the number of small holders would have been vastly greater.

Loss of Life in America by Boiler Explosions during 1838.—It appears, by the statistical accounts, that the awful number of 1,008 persons have fallen victims to the explosions of steam-boilers in America during the past year!

Rain in Egypt.—It has been a very prevalent opinion that it never or very rarely rains in Egypt. Formerly it has been said there was no rain at all, and several wet days having been observed in late years, are supposed to have been caused by a change in the climate, produced, it is imagined, by some extensive plantations in the valley of the Nile. M. Jouard shows, by documentary evidence, that all these opinions of no rain and change of climate are erroneous. Rain, and heavy rains, with thunder and lightning, though rare visitors, are not strangers in Egypt.

Steam-boat Explosions.—M. le Baron Séguier has presented a memoir to the Academy of Sciences, in which he proposes to prevent the disastrous accidents of steam-boiler explosions; 1st, to make the steam chamber and boiler into several, for the purpose of reducing the effect of the explosion; 2d, so to combine these fractional steam chambers or boilers, that they may be as one for all the purposes of the engine, but distinct for construction and repairing them; 3d, so to dispose them that they could not be influenced by change of position in the vessel or boat; 4th, to manage in the apparatus the possibility of assigning different temperatures to different parts, in such a manner that the fire may be under the hottest part, which permits the gas of combustion to be inflamed, so that the smoke may escape after having caressed the coldest part, and united circumstances the most convenient to transmit in the shortest time the heat from the heating to the heated body; 5th, so to dispose the producing surfaces, that, in case of a renewal of water after a too considerable reduction in the level, and incandescence of the sides, the supply of water may not be abruptly thrown over an extent of surface sufficient to produce instantaneously a dangerous quantity of vapour; 6th, to obtain all the prescribed qualities with a light, simple, and economic apparatus. M. Séguier proposes for this purpose to make the fire-place of the union of 16 boilers or tubes of 0°, 16 (1°·67) diameter, and 4 metres long. Seven tubes united together form the upper part or superior wall of the furnace. The two sides, or lateral partitions, as well as the end one (*cloison de refent*) are composed each of three other tubes: the face of the boiler thus presents the appearance of two parallelograms, in juxtaposition of which three sides are composed of tubes; the inferior side is formed of the grate on which the fire is lighted. In the middle of each of these parallelograms is the mouth (*gueule*) of the furnace. All the tubes thus united, have in their length an inclination of 0·66 centimeter. The fire is made at the most elevated end, and hence the cause of the name "*producteur à flamme renversée*," given it by M. Séguier. By this inclination the author says he furnishes the vapour as it is formed with the power of disengaging itself from the liquid to reach the reservoirs specially destined for it in the upper parts; the water also to obtain different degrees of temperature; to give the flame a more intimate contact with the boilers by having "angles of incidence more open," &c., &c.

Now this boiler does not appear to us to be materially different from the tubular boilers so long in use in this country, and particularly that used in Gurney's steam-carriage.

Compressing Atmospheric Air.—M. Savarasse has obtained a patent for the application and method of speedily compressing atmospheric air to 150lbs. on the square inch, by means of chemical action, and very little labour. As the apparatus requires so small a space, compared with the present expensive method of obtaining power from steam; he expects that its application to propel engines, if successful, will be a great improvement on the present method of navigating the ocean by steam-power. He has successfully applied his invention to the manufacture of ginger-beer and soda-water, which he can manufacture perfectly in 15 minutes; the material is bottled and corked up with great speed and economy at the same time, by means of an apparatus attached to the machine. A machine on his plan, he calculates will manufacture four times the quantity of one of the same cost. It consists of a globular generator, from which ascends a cylindrical tube, into which the soda or ginger-beer is placed, the air, by ascent, carries the latter from thence into a small vertical cylinder, where the gas is purified, and thence carried to the large cylinder, which is placed on a swivel, in order to more perfectly mix the liquid with the gas, from whence it is bottled off.

Important Chemical Discovery.—In the manufacture of soda from common salt, it is proposed to use carbonate of ammonia, instead of the pestiferous method hitherto employed. The necessity of decomposing the chloride of sodium by sulphur no longer exists, the newly-discovered process being perfectly free from all noxious vapour. Another advantage is, that the improved method, can, with little additional outlay, be adapted to the manufactories at present in operation. This discovery will be a great relief to the inhabitants residing in the vicinity of soda manufactories.—*Liverpool Paper*.

Improved Draft-box for Locomotive Engines, by Mr. Andrew M. Eastwick, of Philadelphia.—By a specification in the Journal of the Franklin Institute, the above gentleman has suggested and patented a plan for dividing the draft-box by means of a partition, so that the waste steam from each cylinder may pass out of the chimney without interfering with or impeding the progress of the waste steam from the other cylinder. He calculates on obtaining a stronger draft this way.

Brick-making Machine.—The Marquis of Tweeddale has invented a machine which will mould at the rate of twenty-four bricks per minute, or 1,440 per hour, and taking ten hours' work, would give 14,400 per day. The bricks made by the machine will not require one-third of the time to dry them that the hand bricks now take, in consequence of the compression the clay undergoes. Two bricks, one made by the machine, the other made by hand, were put into water six hours; in that time the machine brick absorbed four ounces of water, and the hand-made one twenty-eight ounces. The machine-brick, when burnt, weighs 8lbs., and the hand-made brick about 5lbs.—*Farmer's Magazine*.

Liquid Leather.—A Dr. Bernland, of Larria, in Germany, is said to have discovered a method of making leather out of certain refuse and waste animal substances. A manufactory of this nature has been established near Vienna. No part of the process is explained, only it is said that the substance is at one time in a complete state of fluidity, and may then be cast into shoes, boots, and other articles of dress.—*Bristol Mirror*.

New Method of Preserving Iron Work from Rust, communicated by M. Paymen to the French Institute, consists in plunging the pieces to be preserved in a mixture of one part concentrated solution of impure soda (soda of commerce) and three parts water. Pieces of iron left for three months in this liquid had lost neither weight or polish; whilst similar pieces immersed for five days in simple water were covered with rust.—*Liverpool Mercury*.

French Steam-Engines.—It has been stated to the Academy of Sciences, that M. Powell has constructed, for Gosse de Billy and Co., an engine of 25-horse power, which consumes under 5·9 lbs. avoirdupois of coal per horse power per hour.

Conductibility of Metals, &c.—By some experiments recently made in France, it appears that each of the following bodies one millimetre thick (·039 English inches) will transmit through a square metre of surface the two surfaces being 1 cent. difference in temperature, the following proportions of heat in equal times:—

Gold . . .	21·28	Zinc . . .	7·74
Platina . .	20·95	Lead . . .	3·84
Silver . . .	20·71	Marble . .	0·48
Copper . . .	19·11	Porcelain .	0·34
Iron . . .	7·95		

From these experiments the author draws the following important inference, namely, that in our usual applications the nature and thickness of the metal

have none or but little influence on the quantity of heat transmitted, and that the conductivity is rendered much more effective by rapidly renewing the liquids, wetting the inside or outside of the vessels or tubes.

Curious Railroad Conceit.—It appears by the Journal of the Franklin Institute for March, just received, that Jacob Nollner, of Washington, has actually patented the following odd conceit to obtain velocity. "Let a railroad be made perfectly level and straight, and solid as the everlasting hills; let a car *twenty miles long*!! be placed on this, and be drawn by any adequate power; and let another car, say ten miles in length, be placed on this first car, at its rear end, and let this also have an adequate independent motion power applied to it." If the two cars set out together at twenty miles an hour, the upper car, says the bedlamite or wag, Mr. Nollner, will travel over the ground forty miles an hour, twenty miles being due to its own motion on the lower car, and twenty to the lower car. We suppose the patents in America do not cost quite so much as they do in England.

REVIEW OF BOOKS.

Theory, Practice, and Architecture of Bridges. By Messrs. Hann and Hoskings. Weale, High Holborn.—From part 2 of this work, we perceive the plan is that we mentioned in our last, namely, a collection of papers by various authors, which are paged so as for the paper at length to be separately bound up entire. The present part has a portion of an elaborate paper on the "Theory of the Arch, by the Rev. Henry Moseley, M.A., F.R.S., &c.," and a continuation of Gauthey's. We have already expressed our opinion of this plan of making a book, and shall therefore say no more until we see what the materials are. Mr. Moseley's paper is too much in its infancy to say a great deal of it; but M. Gauthey's begins to display some interest. We cannot, however, wholly subscribe to the theory as laid down by Messrs. Moseley and Gauthey, in the pressure of the arches; we think much is yet to be learnt, in the way of experiment, of the tenacity and aggregate adhesion of building materials, and consequently of the distribution of pressure, before any mathematical theory can claim our confidence. Unluckily, our mathematical men are apt to generalize too fast on practical subjects, and therefore it is that theory and practice are so often at variance. In no subject has this been more exemplified than in the theory of bridges, and hence our apprehensions of seeing a work of this sort loaded with too much theory. We do not fear any particular rupture, but we dread a sinking of the whole fabric from the level of utility and interest to the mire of useless and forbidding symbols.

The present number is ornamented with a section and view of the works of Hutcheson Bridge, Glasgow, the elevation of William the Fourth Bridge, at Sterling, King's and Westley's designs of a timber bridge for Westminster, Ely Iron Bridge, Haddington Iron Bridge, &c., &c.

Greenwich Observations for 1837. 4to. J. Murray.—This volume adds another testimony of the unremitting labour with which the heavens were watched, under the direction of the Astronomer Royal, during the year 1837. When one looks at this immense tome of observations and calculations, he will hardly reckon the situation of Astronomer Royal among the sinecures. Appendix No. 3, containing the "Logarithms of the lines and cosines for every ten seconds throughout the twenty-four hours," and another, No. 4, for converting sidereal into mean solar time, are added. The plan of adding appendices of useful tables to the annual volumes of observations is one of great utility. We believe it was first introduced by the present A.R.

Engineer's Common-place Book of Practical Reference. By William Templeton. Simpkin and Marshall.—The author of this little work is already favourably known to the public by his "Millwright and Engineer's Pocket Companion." His present book will not sink his credit; it is a useful little work, and displays considerable powers of observation. Several of the rules are new, or such as we have never met with before, and the arrangement is good.

Wood's Practical Treatise on Railroads. Third Edition. Longman and Co.—It was but lately we announced a second edition of this work. By our wrapper we perceive a third is now out, very much enlarged. We have not seen this edition, but from the experience Mr. Wood has had on the Great Western line, we should apprehend he has been able to make some valuable additions to the work.

The Architect, Engineer, and operative Builder's Manual; or, a Practical and Scientific Treatise on the Construction of Artificial Foundations for Buildings, Railways, &c. By Christopher Davey, Arch. & C.E. John Williams, Library of Fine Arts, Great Russell-street, Bloomsbury.—The author commences the first part of his work by giving a useful register of the principal geological formations in each of the counties of England and Wales, with observations on the quality of the materials to be derived therefrom, applicable to the purposes of building; also the situation of the principal stone quarries, lime-works, &c. He next remarks on the examination and general order and succession of strata, and describes minutely a boring apparatus from the drawings and invention of Luke Hebert, Esq., C.E., with an explanatory diagram, used for the purpose of ascertaining the nature and depth of the different strata. In order to reduce the excessive labour and tediousness consequent on using the ordinary boring implements, he proposes that "an auger be made with a spiral worm winding round a cylinder, which is to form its centre. The cylindrical part is not to be solid, but to be perforated throughout its whole length with a square hole of two inches or more in diameter, for the purpose of receiving within it an iron bar of the same figure and admeasurement. The bar will thus serve the double purpose of a spindle, or shaft, to work the auger and cause it to bore; and as a slide upon which it may be drawn up with facility from very great depths to the surface in a few minutes of time, contents discharged, and let down again as quickly." Speaking of foundations, the author says, "The extreme density of the London clay is shown to afford a highly favourable substratum for the erection of heavy works, where it is not intersected by the river or streams. The plastic clay formation, on the contrary, is exhibited as containing numerous springs, and is altogether of such a nature as to warrant its abandonment as efficient strata for the erection of foundation walls, &c., &c." • • • "That there are only two of the strata above the chalk which possess the advantage of sufficient consolidation for the support of works of magnitude, these are the gravel and the London clay. Referring to the former strata, we may remark, that when there occur a series of thin beds, almost approaching to laminæ, they should be wholly discarded, or such means adopted as are hereafter to be mentioned. But when the bed of gravel is consolidated, or partakes of the nature of conglomerate, and of a thickness equal to the mean distance between the principal points of support, then the foundation may be deemed secure, and built upon accordingly." • • • "It will appear obvious that much must be left to the skill of the architect, according to the exigencies of the cases as they occur in practice."

The chapter on piling contains many useful remarks on the variety of artificial and natural substratums that are to be met with, the difficulties of

which may be successfully overcome by piling or using foundations of inverted arches, and other means.

"Foundations upon sandy beds have been formed with considerable success. The erection of the light-house upon Spurn Point, by the late Mr. Smeaton, is a useful example to the student, and shows that a firm sand will resist the insertion of piles after the depth of nine feet."

This chapter also contains descriptions and plates of various machines used for driving and withdrawing piles, and practical remarks on driving piles for the various purposes of building. In adverting to iron piling, it has been demonstrated, says the author, "that iron buried in the earth under water, and kept perfectly free from atmospheric influence, will not sensibly corrode for an indefinite period, and in process of time is converted into steel of an excellent quality. The action of water upon iron effects a result totally different, producing within a short period a material resembling plumbago, which may be cut with a knife, therefore timber in such situations should have the preference." There is also an account of the nature and application of *béton*, from the French of M. Belidor; the process of making and using it in foundations for piers, sea-walls, jetties into the sea, &c., with plates and descriptions of the machines and *encaissement*. In the "construction of the foundations for a fort or jetty in the sea, at the depth of fifteen, twenty, or even twenty-five feet." * * * "The works being marked out with buoys, and guarded from the action of the waves by a temporary counter mole, if judged necessary, are commenced by erecting a coffer-dam, of the usual construction, by piling, &c.; this dam, however, need not be so complete in its appliances as those generally employed for the purpose of bridge-building." * * * "Means must be employed to clear the bed of the river from all extraneous deposits." In the dam this is done by means of a kind of dredging machine, "*machine à cuillière*, placed on the summit of the coffer, which may be advanced as the work proceeds, and will lay open the ground to the firm strata which, in most instances, will be but a few feet below the alluvial deposit." * * * "The width of the coffer being equal to the thickness of the masonry, the rule is, when carrying on works such as operations in the interior of a haven, to calculate this thickness at one-half of the depth of the water, but should the masonry be exposed to the open sea, or a strong current, then it ought to be two-thirds." Specifying that the distances of the piles should be proportionate to the height of the *masonry and béton*, he states, "Whenever that does not exceed 10 feet, 6 feet from the centre of one pile to the centre of another will be sufficient. At about 16 feet they should be 4 feet apart, but when it rises to the height of 20 or 25 feet, the distance of 3 feet apart should not be exceeded." * * * "The plank-piling should be well bound together by groves and wedges," * * * "leaving no aperture, however small, at the joints, in order to secure every particle of the lime and *pozzolano* within the proper limits." Describing the best manner of compounding the *béton*, he says—"Having chosen an even and well-beaten ground, take 12 parts of *pozzolano* (*Terrasse de Hollande*, or *Cendré de Tournay*), of which you will form a circular wall of 5 or 6 feet in diameter, on which place 6 parts of sand, well sifted, free from earthy matter, and evenly spread. Fill the interior of this circle with 9 parts of quicklime, well calcined and pulverized with an iron beetle; and to cause it to slack more quickly (in maritime works), throw on sea-water in small quantities, stirring it from time to time with an iron spatula. As soon as it is reduced to a paste, incorporate the *pozzolano* and the sand. The whole being well mixed, throw in 13 parts of unhewn stone, and 3 parts of iron dross well pounded. If this latter ingredient cannot be obtained, 16 parts (instead of 13 parts) of rough stones

or pebbles must be added, of a size not larger than a pullet's egg. Let this composition be well amalgamated for the space of an hour, after which it must be left in heaps to coagulate; for this purpose the space of 24 hours will be sufficient in summer, or in warm climates, but in winter it often requires the space of three or four days. Observe to keep it protected from the rain, and not to use it until it has sufficiently hardened to require breaking with a pick-axe. It must be borne in mind, that, though the *béton* is employed in a consolidated state, when it has passed through the water and has reached the bottom it spreads and settles. The plunging machine is advanced, according as a bed of 10 or 12 inches in thickness is spread over the whole foundation; after which place unhewn stones of moderate size, the largest not exceeding the fourth part of a cubic foot. These stones should be carefully arranged side by side; they will sink into the mortar, which is now in a soft state, but which will, in the space of three or four months afterwards, become indissolubly united, and its firmness will increase with its age. This bed of stones having been again covered with a fresh stratum of *béton*, commence another, and so on alternately," nearly to the surface of the water. * * * "The foundation having been left, at least during the winter, to allow it to harden, the masonry must be raised by regular courses." In works of this kind, it is not necessary to remove the water from the interior of the dam. The *béton* is therefore immersed to prevent too great a separation of its parts by means of a "plunging machine, which can be moved along the *encaissement*, and from it the square chest, containing 27 cubic feet of *béton*, is lowered into the foundation, and when it arrives within four feet of the ground, or work, its own weight forces a catch to let the bottom of it open and deposit the *béton*. The *encaissement* is not removed until the work is completely consolidated. By the foregoing method, one of the jetties at Toulon was constructed in the year 1748."

The analysis of limestone, and the various methods of calcination adopted in Great Britain and Ireland, with plates descriptive of the plans and sections of the kilns are next given, and the volume concludes with an instructive chapter on limes, mortar, sand, and sandstones.

This is really a very useful practical work. The plates and cuts are numerous and very creditably executed, and the book altogether forms an indispensable item in every architect and engineer's library. H.

RAILWAY NOTICES AND STEAM NAVIGATION, &c.

Aylesbury Railway.—This railway will be opened on the 11th of June.

Birmingham and Derby Junction Railway.—It is expected this line will be opened to the public at the end of June or early in July; and by the spring of next year the railway to York, by this and the North Midland line, will be opened, giving an entire line from London to that city.—*Derby Mercury*.

Bristol and Exeter Railway.—The shareholders will be glad to learn that Charles Bowles Fripp, Esq., has been elected to the office of managing director of the Bristol and Exeter Railway. It would be difficult to find a man better qualified for the office. We understand it has been strongly agitated in this company to lay down only a single line of rails, at first continued on to Taunton, instead of a double and stopping at Bridgewater. The expense we understand is about the same. Our opinion is always in favour of anything that will save expense, and increase the revenue; but order and safety must not be lost sight of. If a single line will do, the directors will act wisely in adopting it; but it must be recollected that the farther

they extend the railway, the more traffic will be brought on it, and the less capable will a single line be to carry it all. As, however, laying down one way does not interfere with laying down a second, we see no objection to it as an experiment. We are glad to find from the following circular by James B. Badham, Esq., the secretary, that the Company have determined on allowing interest at 4 per cent. per annum, on the calls. The measure is a wise one, and we have no doubt will work well :—

“SIR,—By order of the Directors I beg to inform you that in compliance with a requisition presented to the Board with the signatures of nearly all the shareholders in this undertaking, *Interest at the rate of four per cent. per annum from the 6th of April last*, payable half-yearly, will be allowed on all shares upon which the calls have been, or may hereafter be paid up, and the holders of which shall have signed the said requisition, or shall sign an agreement of similar import. I have the honour to remain, Sir, your very obedient servant,

J. B. BADHAM, *Secretary.*”

This arrangement has already produced a considerable demand for shares, and the prices are rising. We understand the works are most actively proceeding. It is expected the line will be opened to Bridgewater by the time the Great Western will open from Bristol to Bath.

British Queen.—Our readers will notice, on reference to the advertisement on our wrapper, that the departure of the British Queen, so long delayed, is at length announced for the 29th June from London, and 1st July from Portsmouth. The triumph of Atlantic Steam Navigation must be gratifying to the original projector, our enterprising correspondent, Junius Smith, Esq., who, it is well known, fought his way through the most formidable obstacles arising from private and local interests, incredulity and prejudice; and now, after the labours of six years, sees the full development of what was tauntingly called schemes, chimeras, and wild enthusiasm, &c. &c. We hope the hundreds of thousands and millions which the indefatigable mind of this gentleman, marching in advance of the times, has benefited, and will benefit, will not allow him to sit down with the bare satisfaction of seeing his views accomplished, but that they will give him some more substantial proof of the incalculable advantages he has rendered them, and the new and old worlds.

Birmingham Railway.—We are glad to hear that the receipts on this line have materially increased. They have latterly risen, we understand, to 12,000*l.* or 13,000*l.* a-week; the estimated traffic was 24,500*l.* The increase has been the most marked on the parcels.

Bolton and Preston Railway.—At our request a friend has furnished us with the following sketch of the situation of the works, and history of this line:—“The first contract, 3 miles, including the passage through the town of Bolton, where the line passes *under* the streets, was only let on the 27th December last, and so rapid has been the progress made by the contractor, that he is now pressing for the permanent rails for the whole length, except little more than a quarter of a mile in the town. The second contract will extend probably 7 miles further, and the directors are every day expecting Mr. Rastrick to fix the day for letting this; the work upon this length will be exceedingly light, and may be executed with great rapidity. The remainder of the line to the junction with the North Union Railway, will form another contract, being only 5 miles in length; and this probably may also be let in the course of three months. The Bolton and Preston Railway was originally taken up by persons deeply interested in the town and trade of Bolton, and of parts of the district through which the line passes, about 8 years ago; it then formed part of a whole line from Manchester to Preston, but the promoters were induced to restrict their application to Parliament at that time to the line from Manchester to Bolton,

in which they were defeated through the success of a competing company, who then obtained the power to make the line recently completed from hence to Manchester. The same parties took up the Bolton and Preston line again in 1836-37, under an apprehension of prejudice to the town and district through the completion of the North Union, as well as under a conviction that the Bolton and Preston Railway, if made, would not only prevent much prejudice, but be productive of great advantages. None of these persons were railway speculators, and they took perhaps more pains than were necessary, in allotting their shares, to exclude *speculators*. Their main object, therefore, has not been to make the railway for the sake of large dividends upon the money invested therein, but with a view to continue and increase the prosperity of the town and district generally, and of their own respective establishments individually, but they have nevertheless always expressed great confidence in the railway yielding, if not extravagant profits, at least a respectable return for the capital to be invested in it, and I believe none of them would compound for less than 8 per cent. The board is composed of sound practical men of business, and the completion of the line may be considered as now beyond risk."

Brighton Railway.—The directors of this company have just been inspecting the whole of the line from its junction with the Croydon to Brighton, and the Shoreham branch. From the engineer's periodical reports they had been led to expect that they would find considerable progress had been made, but their expectations have fallen considerably short of the realities which met their view at every point of the line. The magnitude of the works, the vigour and energy that have been displayed, and the vast amount of work effected, have excited the highest gratification, and indeed astonishment. In many places the permanent rails are laid. Upon the Shoreham branch, where a locomotive engine is at work, nearly 4 miles are down. Every individual connected with the line evinces the most determined interest and perseverance in prosecuting their several departments with the utmost activity. It would be extremely desirable that those persons who have been sceptical as to the practicability of the line, as well as those who are prone to listen to reports, however vague and fallacious, should visit the works and satisfy themselves by ocular demonstration, that the issue is not problematical.

[Vice-chancellor's Court, May 2d.]—Mr. Kemp, the owner of property in Brighton, sought to obtain an injunction to restrain the company from altering a road which would cause him and his servants to go not less than 800 yards round, when the direct distance was only 10 yards, and wished to make them construct a road immediately over or under the railway. The Vice-chancellor directed the motion to stand over for the present, until it should be seen what course the company took. Probably they might not do what was apprehended, or if they did it might be found agreeable to the public.

Bristol and Gloucester Railway Bill.—The Committee on this Bill have made their Report, which is favourable to the proposed undertaking. That Report sets forth, that doubling the number of passengers now conveyed by coaches and post horses, the anticipated passengers by the projected rail-road will amount to upwards of 225,576 persons: and that about 67,054 tons of goods may be expected to pass annually along the rail-road. That the amount of income expected to arise from the conveyance of passengers is 87,863*l.* 2*s.*, and from goods 31,573*l.* 6*s.*, making a total of 119,436*l.* 8*s.*; the proportion of income arising from passengers is upwards of seven-tenths, and the goods most likely to produce income are, spirits, silks, wines, Manchester goods, sugars, wool, teasles, dried fruits, and tobacco. That the railway proposed by the Bill is an extension of an existing railway,

for the purpose of completing the communication between the north and the west of England, which communication, with the exception of the line proposed by the said Bill, has been already authorized by Parliament, and is now in the course of construction. It appears by the report that there is only one plane on the line upon which stationary or assistant locomotive engines will be required; the length of this incline is rather more than two miles, and the inclination seventy-four feet per mile. There will also be a tunnel about sixty chains long, twenty-five feet broad, and twenty-five feet high, which will be ventilated by three shafts. The gradients and curves are very favourable, the steepest gradient (with the exception of the inclined plane above referred to) being 1 in 330. The cost of the line is estimated at 400,000*l.*, and the charge of the annual expenses 59,718*l.* 4*s.*, being 50 per cent. upon the estimated annual receipts. The Bill was read a third time in the House of Commons on Monday evening, and passed by a majority of 104.—*Midland Counties Herald.*

Brunswick and Wolfenbützel Railroad.—There are days on which the number of passengers is above 4,000. The undertaking has, therefore, fully succeeded, and does great honour to the projector.

Commercial Blackwall Railway.—At a meeting, on the 7th ult., of the proprietors of the United East and West India Docks, resolutions were passed in favour of the extension of the line to Fenchurch-street, as a valuable feature in the line, and to authorize the dock directors to invest 7,083*l.* paid by the railway to the dock, for property taken in the railway shares.

Continental Railroads.—The double line of railway is on the eve of being laid down from Malines to Liege and Ostend, in the same manner as it has recently terminated between Brussels and Antwerp. In the mean time, travellers can proceed from Ostend to Liege, a distance of 130 miles, in 6 hours and 55 minutes, and the fare, for first-class passengers, is 16½ francs (13*s.* 9*d.*); second-class, 14 francs (11*s.* 8*d.*); third-class, 9½ francs, (7*s.* 11*d.*); and fourth-class, 5½ francs (4*s.* 9½*d.*); so that a poor person can thus travel a distance of 130 miles in 7 hours, for the small sum of 4*s.* 9½*d.*—*Manchester and Salford Advertiser.*

Cheltenham and Great Western Union Railway.—The half-yearly general meeting of the proprietors of this undertaking was held at the King's Head Hotel, Cirencester, May 1st, W. H. Hyett, Esq., in the chair. The attendance was tolerably numerous and very respectable. The directors' report, which is a very interesting document, and which appears on our wrapper, was read by the Chairman, as also the general statement of accounts to the close of last year. Mr. Hyett then said, after some preliminary observations, that the only cause to create a doubt as to the state of the company's affairs, he believed, was the low price of shares in the market, and the consequences which resulted from that low price; and it would be for the meeting to consider by what that deterioration had been occasioned; whether from any original inherent defect in the scheme itself; whether from any mismanagement on the part of those who had to carry out the details; or, lastly, admitting the undertaking to have been sound in itself, and to have been properly managed, whether the deterioration in the price of shares could not be traced to circumstances over which the directors could have no control whatever. For his own part he was inclined to think that the last inference might be fairly deducible, inasmuch as all similar undertakings were in a greater or less degree affected in a like manner, however good they were in principle and however undisputedly well managed in practice. In the observations he should have to lay before the meeting, he should have in view two points especially—

first, to show that calls had been made with proper prudence and caution, and that payment of those calls had been enforced with justice to all parties; and secondly, that the works had not been carried on rashly or precipitately, and that nothing had been done but what was necessary should be done in order to carry out the objects of the undertaking and the wishes of the shareholders, as expressed at the various meetings of the company. This the honourable gentleman did most satisfactorily by going into a history of the undertaking, and reading various extracts from the published documents of the company up to that part of the report of the company for November 3d, 1837, which states that "an arrangement with the Great Western Railway has been suggested for renting the tolls and rates, to be levied on the line from Swindon to Cirencester, when completed, at 17,000*l.* per annum, the lessees maintaining the road for a term of years." Mr. Hyett next read extracts from the report of the 4th May, 1838, showing what steps had been taken to carry the resolutions of the former meeting into effect: but that on going to Parliament for extended powers, the Birmingham and Gloucester Company obtained the insertion of clauses, making it compulsory upon this company, under certain conditions, to complete that portion of the line between Cheltenham and Gloucester by June, 1840. "In order to effect this (the report proceeded to state), that portion of the line must be commenced without delay, and the works must be carried on simultaneously with that portion of the railway lying between Cirencester and Swindon." The next report, which was that of 2d November, 1838, stated what progress had been made in the affairs of the company, and recommended procuring contracts for sinking the permanent shafts in the tunnel at Sapperton, which was approved by the proprietors. Mr. Hyett then adverted to the difficulty experienced in all undertakings of this extensive nature to satisfy the wishes of all parties. Complaints had been made by one class of proprietors that the works were not carried on on a more extended scale, to ensure an early return for the outlay; another class complained that the directors extended their operations unnecessarily, while the directors were anxious to make as much progress in the works as possible, yet had felt it necessary to exercise the greatest caution. They considered also that they ought not to make repeated calls without using every possible exertion to recover those in arrear. They had consequently taken the necessary steps to enforce payment of these arrears. It rarely happened in such retrospective cases but that something was discovered in which a better course might have been adopted; but he confessed that under all the circumstances of the case he did not see how the directors could have acted better for the interests of the undertaking than they had done. They had exercised every possible caution—some people perhaps might say that they had been too cautious: at all events they had acted to the best of their judgment, and it would be for the meeting to approve of their conduct or not. (Applause.)

Mr. DAVID BOWLY said, he rose to move that the report of the directors be received and adopted, and that they be requested to have it printed and circulated among the shareholders. The meeting had heard the report read, and the remarks of the chairman, and it was not necessary, after the explanations laid before them, for him (Mr. Bowly) to make a long speech. The report was, under the circumstances, perfectly satisfactory to his mind. Undoubtedly it was no cause for satisfaction that so many shares had been declared forfeited; but having been forfeited, it was a matter for congratulation that they had been taken up by responsible parties. This, however, only showed that they were not to expect to be exempted from the general liability to which all commercial dealings

were subjected. As to the present value of shares in the market, he did not consider that circumstance to have the smallest bearing upon the ultimate value of them when the line was finished. It was well known that, whenever anything was forced upon a depressed market, the price fell in proportion as the market was overstocked, without reference to the real value of the commodity offered. He saw no reason whatever for being discouraged with respect to the prospects of this undertaking. If when it was first projected it was ascertained that there was ample traffic on the line to make it profitable, nothing had since occurred to alter that opinion. On the contrary, everything now not only confirmed the calculations then made, but operated to enhance them. It was known that the traffic had increased, and that trade was greatly improved; so that there was not the slightest reason to be discouraged. Some people had said, "See how much money is locked up without producing any interest." Very true; but how could they expect to have any interest till the line was opened? He believed the undertaking to be a good and profitable one; he had every faith in the engineering statements and estimates that had been made; and he was convinced that the affairs of the company were under the direction of as honest gentlemen as any in the kingdom. (Applause.) He had every confidence in them, and was quite willing to leave his money in their hands, being perfectly satisfied that they would lay it out in the best possible manner for the permanent welfare of the undertaking.—Mr. MULLINGS put one or two questions to the chairman as to the formation of that portion of the line between Gloucester and Cheltenham, in reply to which it was stated, that one moiety of the expense which the company had and would be put to in regard to this distance, would be refunded with interest at five per cent. to this company by the Gloucester and Birmingham Company. Mr. Mullings remarked, this was a satisfactory prospect. In answer to another question, it was stated by the chairman and the company's solicitor, that in no case had shares been declared to be forfeited, until it had been ascertained that the calls in arrear could not be recovered if legal expenses were incurred.—Mr. ROGERS conceived it would be highly desirable for the company to confine its expenditure to the completion of the distance between Gloucester and Cheltenham, and between Swindon and Cirencester, leaving the middle branch of the line for the present, at all events, untouched.—Mr. HYETT and other members of the direction explained that till the next half-yearly meeting the expenditure would be necessarily confined almost exclusively to the proposed object, but that to restrict the directors by a positive pledge to expend no money whatever upon the other portions of the line, no matter what advantageous circumstance might by possibility present itself, would be injudicious, and might prove very detrimental to the real interests of the company, and that the directors would decline giving any pledge on the subject.—Mr. S. Marling, Mr. Sutton, Mr. Sage, Mr. Lewis, Mr. Brown, and Mr. Thos. Warner, expressed themselves decidedly in favour of the entire line.—Mr. BRUNELL, having been called upon to state whether any circumstance had occurred within his experience to enable him to give any more detailed information as to the expense of the centre portion of the line than was contained in the former report, said, he could state nothing further upon this point than what already appeared in the reports of the company. Revised estimates had been made of all that portion of the line which had been set out, and which formed a considerable portion of the whole distance. These revised estimates left a balance of 224,080*l.* to be applied towards the remaining six miles and a-half through the Stroud valley and the Sapperton tunnel, and this sum, by a rough estimate, it was

calculated would be sufficient to complete the work. Since that period nothing had occurred to induce him to make a more exact calculation as to this portion of the line, for, in fact, the survey had only been completed within a day or two, and he could only say, therefore, that nothing had occurred to enable him to give any opinion one way or the other. He could only say, that the reports which were in circulation as to the enormous cost of the tunnel, were quite absurd. At a previous meeting a question was asked, in reply to which it was stated, that the probable expense of the shafts would be about 10,000*l*. The shafts were now about half completed, and he was therefore enabled to say, that the actual cost would be about what was estimated; it might be a little less, but it would not exceed the estimate. It had been reported that the expense of the tunnel alone would be 300,000*l*. This was out of all reason. The Great Western tunnel at Box was much larger, longer, and deeper, and altogether more expensive, but even that tunnel would not cost anything like the sum talked about for the one at Sapperton.—Mr. MULLINGS suggested that a survey should be made of the portion of the line under discussion, and the revised estimates laid before the shareholders.—Mr. HYETT said, before the works on this portion of the line would be commenced, the directors would, as a matter of course, cause revised estimates to be made; and after some further remarks, the motion, that the report be approved, was put, and agreed to unanimously.—The resolutions, for which see our wrapper, were then put, and carried, and the vote of thanks to Mr. HYETT, with acclamation. In the course of the meeting it was stated, that the directors held no less than 1-10th of the whole number of shares among them—a sure proof of their confidence in the undertaking.—Abridged from the *Gloucester Journal*.

Calcutta and Diamond Harbour Railway and Dock Company.—[TO THE EDITOR OF THE RAILWAY MAGAZINE].—Sir,—I am directed by the promoters of the above undertaking to request the favour of your informing me by whose authority you published a report on the Calcutta Railway project, in your April number.

I am further directed to forward for your information a report on the same, by Captain J. T. Boileau, of the Bengal Engineers, now in London, and which has been adopted.

Should you conceive, for one moment, the same was sent by me, as my name is mentioned, allow me to take this opportunity of assuring you it was not.

I am, Sir, your most obedient servant,

29, Bucklersbury, May 13, 1839.

H. A. HORNEMAN, *Secretary*.

••• The report in question, which appeared in our 38th number, was left at our office in a printed form, with Mr. Horneman's compliments. Of course we supposed it to be an official document, and that we were doing him a favour by inserting it, which we did at great inconvenience to ourselves. Whoever was guilty of sending it to us in such a way, without authority, has acted, to say the least of it, very improperly, and we should like to know who he is.

The report of Captain Boileau, alluded to in Mr. Horneman's letter, we are unable to notice further in the present number, though it be a very valuable one.

Croydon Railway.—This line of railway will be opened June 1st; about this time, we anticipated in our last, it would. It is expected the Lord Mayor and Lady Mayoress will be present. May 23d the Greenwich and Croydon directors having furnished special trains to take the Brighton directors to the junction of their line with the Croydon, we took the opportunity of a hasty run down to Croydon with them. As a friend has promised

us some account of the line and works by our next, we shall not here anticipate it, except so far as to say, that the works are exceedingly substantially and well executed, and the stations very commodious and laid out with great judgment. The embankments and cuttings stand well. The rails are laid on Kyanized longitudinal bearings, supported also on flat cross sleepers, the whole forming one compact framework, strong as if intended to last for ever. Some of the bridges are particularly elegant. One near the Jolly Sailor is a skew-bridge upon an entirely novel principle. Instead of 1 skew-arch it consists of 4 rectangular brick-arches or ribs. But we must stop; for if we begin to describe we shall anticipate our friend, and inevitably run into a long article.

We were very much struck with the noiseless smoothness of the way and the beautiful scenery of the ride. A new and delightful country is opened up. Some of the stations are in truly picturesque situations, and we cannot help thinking this will be a very favourite trip with our Londoners, as soon as it becomes known.

Chester and Holyhead Railway.—May 2d a large meeting was held at the Thatched House, St. James's-street, W. O. Stanley, Esq., M.P., in the chair, for the purpose of showing Mr. George Stephenson's sections of a line he has surveyed between Chester and Holyhead, and inducing the Government to give a sanction to this line as the best to connect Ireland with England. The meeting was highly respectable. The discussion turned chiefly on a comparison between this line and Mr. Vignoles's Port Dynllaen line, and the passage of the Menai. Mr. Stephenson represented this as one of easy construction, under the average cost of railways, and many miles shorter than the other, whose merits he summed up as impossible to be made. Mr. Stephenson proposed to pass the Menai-bridge by drawing the carriages over singly by horse-power. Resolutions in favour of this line, and recommending the Government to give it its support and sanction, were passed, and the meeting separated.

Now it may be laid down as a principle, that the shorter the uncertain passage by sea the better. There is no doubt, also, that this line is much better in gradients than the Port Dynllaen one. The worst gradient on the former is 16 feet a mile for 2½ miles, while on the latter is one of 35 feet a mile for 14 miles together. Mr. Stephenson's notion, however, of passing the Menai is perfectly absurd; in fact, it is monstrous. The bridge between the centres of the pillars is 579 feet; each carriage, therefore, if drawn by a horse, could not have to be drawn less than 1,000 or 1,200 feet. Supposing there were 10 carriages besides engine and tender, from 12,000 to 14,000 feet, between 2 to 3 miles would have to be traversed in the middle of the line by horse-power, which, including unhooking, rehooking, &c., could not be done in less than a-half or three-quarters of an hour. That is, from 15 to 20 miles would be lost by a passage of only 580 feet. The only rational way of passing the Menai is by another bridge, either wooden as Mr. Stephenson suggests, or iron as the late Mr. Rennie and Mr. Telford proposed. Mr. Rennie's two plans were estimated at 268,500*l.* and 290,417*l.*; Mr. Telford's, consisting of a single cast-iron arch of 500 feet span, was 127,000*l.*

Dundalk Western Railway.—We understand the directors of this line have commenced operations, and that they intend to prosecute the works with energy. We wish the undertaking every success.—*Drogheda Journal.*

Edinburgh and Glasgow Railway.—Upwards of 20 miles of this line are contracted for, and 8 miles more are advertised. These 28 miles comprehend all the heaviest part of the works. The contractors are bound to

finish their works in 1841. Messrs. Gibb and Son are proceeding with the erection of an extensive viaduct across the Almond-valley. Messrs. Marshall are busy at the Glasgow terminus, and are burrowing in the earth at various places to facilitate the execution of the tunnel. The contractors for the tunnel through Callendar-park are making considerable progress. The directors are much occupied with arrangements for land, and have made several satisfactory agreements. They have settled with the Union Canal Company on terms acceptable to both parties, and the Forth and Clyde Canal Company have permitted the line to pass under their canal without any equivalent.—*Glasgow Journal*.

Glasgow, Paisley, and Ayr Railway.—The directors have determined to open the southern end of this line from Ayr to Irvine in the month of July next, the permanent way being already laid for the greater part of this distance, and the progress of the work on the remaining portion being such as to ensure its completion within little more than a month from the present time. The progress of the works on the different contracts along the whole line is highly satisfactory, and no doubt is entertained of the railway being in full operation by midsummer, 1840. The circumstances of this great undertaking being completed in so short a time from the commencement of the works last summer, and being finished for the estimated capital, is highly creditable to the engineer; for we believe there is not an example of the kind in any railway hitherto made. The Tradeston contract, which terminates the line at the Broomielaw at Glasgow, has been also let, and there is no doubt of its being finished during the present summer.—*Glasgow Courier*.

Glasgow, Paisley, and Greenock Railway.—Between Glasgow and Paisley the work progresses rapidly, and a great part of the permanent way is in course of being laid. The drift-way through the Arkleston tunnel is almost completed, and the tunnel is widened out for a considerable part of its length. In Paisley the bridges and walls are very forward, and the large bridge over the Cart, has its centre ready for turning the arch. Proceeding westward beyond Paisley, the walls and embankments are creeping up, and the railway is already carried over the moos. The consolidation is becoming daily more apparent. Between West Ferry and Port Glasgow, the work is comparatively light, and has made great progress since the last inspection of the directors. Energetic measures are taken to secure a completion of this line by the 1st of June, 1840.—*Glasgow Journal*.

Great North of England Railway.—The directors of this company, accompanied by their secretary, engineer, and land-agent, made a progress through that portion of their line extending from Darlington to York, during the last week. After examining the two contracts in Durham, they proceeded to the bridge over the Tees at Croft, and from thence walked along the line to Northallerton, making a minute inspection of all the works as they passed. The following day they visited the contracts, near Thirsk, and afterwards held a board meeting in that town, which was attended by the principal shareholders of the neighbourhood. The directors were gratified in ascertaining, by their personal inspection, the rapid progress making in the cuttings, embankments, and bridges. Every information is readily and cheerfully afforded to all persons applying at their office in Darlington-street.—*Liverpool Journal*.

Great Western Steam-ship.—We have been favoured with the following copy, or extracts, from the log of the Great Western, on her last passage to the westward; a passage which the American papers, and the letters of passengers, which have appeared in the papers, represent, as by far the greatest triumph hitherto accomplished. It appears that she left Bristol

a little before midnight on the 23d of April, and arrived at her anchorage in New York harbour at midnight on the 14th of May, making twenty clear days, being three days longer than the November passage, and three days and a half longer than that performed in January and February, in both of which she encountered the heaviest description of gales, although on neither was the wind so enduring from the westward, or the gales so long. Before, however, laying the extracts before our readers, (who since we altered our title have been not a little eager for steam-ship information,) we must, in justice to the Great Western Company, admit them to be the proprietors of a system of navigation which, more than anything else, gives facilities which cannot but encourage, foster, and render enduring, the bonds of amity between the people of the United States and her Majesty's lieges. The facilities of frequent intercourse by thousands instead of hundreds, will tend to prevent future wars between people belonging to the same race, speaking the same language, descended from the same progenitors, and closely bound together in those relations which belong peculiarly to large maritime nations, vying with each other in spirit and enterprise, and who only need a more intimate acquaintance with each other to be satisfied that each has been taught to magnify the failings of the other, and that, in fact, there is no reason why the same good feeling should not exist now which we may presume to have existed before the dissolution of the Union. To the Great Western Company we say both nations owe an eternal debt of gratitude. They took the thing up scientifically, and we know they have scientifically carried it through. It has long been our intention to republish the report of the committee which set the company going for the purpose of comparing the practice with the opinions put forth before the company's formation, and when we can find space we will do so. At present we shall content ourselves with stating, that, in that report, it is said that nothing but continuous westerly gales can cause the passage to be spun out to twenty-four days. On this March passage, the reader will find that strong westerly gales, or strong westerly winds, prevailed for seventeen days, westerly breezes nine, moderate stern gales four days, and a fair steaming-breeze a-head with smooth water one day; so that if the two moderate days had still remained the same as the average of the seventeen days, we may presume that the passage would have been exactly twenty-four days; and it is no small matter to steam navigation to arrive at this conclusion, to know the worst which is to be expected. The coals laid in by the Great Western lasted well, and with the same expenditure which marked the whole bad weather time, we are informed might have been made to last three or four days longer. When the captain had his port within his grasp, we hear, he ordered the expansive gear off, and nearly doubled his consumption, but still had a good quantity of coals left on his arrival. From the first we have watched the proceedings of this company with interest and anxiety, and we cordially rejoice at the success of their labours. We are informed a most perfect understanding subsists between the Liverpool and the Bristol companies. This is as it should be, and we hope it will extend to every case, and bind all the companies in one bond of amity.

Remarks.—March 24, W.N.W., strong winds; at eight, strong gale. March 25, W.N.W., strong winds; moderate gales and squally. March 26, W.N.W., strong winds; sea, which had been heavy, going down a little. March 27, West; more moderate at first; a gale at six. March 28, W.N.W., moderate gale; a heavy gale and high sea. March 29, W. & N., fresh gale, strong gale, heavy gale. March 30, West, heavy gales, and high seas. March 31, W. & N., more moderate, but still a gale. April 1, West, moderate winds, sea going down at noon, squally and threatening.

April 2, W. & N., a gale, with heavy cross sea. April 3, W. & N., a gale, with heavy cross sea. April 4, W. & N., a gale; sea high, but more regular. April 5, W.N.W., a gale; sea high, but less sea. April 6, W.N.W., more moderate early; a complete storm in the evening. April 7, W. & N., more moderate weather till midnight. April 8, W.N.W., fresh breezes; early frost, strong winds at night. April 9, N.W., sail set; strong breeze. April 10, N.W., sail set; strong breezes, sea up. April 11, N.W., sail set; strong breezes. April 12, sail set; strong breezes. April 13, West, all sail in, and doing well. April 14, West, smooth water; arrived at Sand Hook anchorage at midnight.

The "Bristol Mirror" says, "She sailed from Kingroad, on her outward-bound voyage, at twenty-five minutes past three o'clock on the 18th of May. She has taken with her 107 passengers. Her cargo consists chiefly of British-manufactured goods, cotton prints, &c. The number of letters forwarded by her through the Post-office is 3,835, and newspapers 812. The number of letters from the company's office is said to be nearly, if not quite, double those from the Post-office, and a very large number of newspapers.

Grand Junction Railway.—We understand that on the receipts of the first eighteen weeks of this year, compared with the same period of last year, there is an increase of 42,000*l*.

Greenwich Railway.—The passengers carried on this line during the Whitsun-week and the receipts have exceeded those of any former period. The numbers were, Monday 35,336, receipts 1,227*l*. 15*s*. 10*d*.; Tuesday, 22,877, and 784*l*. 18*s*. 5*d*.; Wednesday, 10,028, and 343*l*. 8*s*. 4*d*.; Thursday, 4,635, and 117*l*. 6*s*. 6*d*.; Friday, 3,372, and 122*l*. 7*s*. 2*d*.; Saturday, 346*l*. 2*s*. 2*d*. Total receipts, 2,941*l*. 18*s*. 5*d*. A considerable accession of traffic will of course arise from the opening of the Croydon line, June 1st. We have indeed but little doubt that this line will ultimately become a very profitable one. We are sorry in our trips down it to see that in many places the rails are both out of gage and out of level. A marked difference exists, both in the noise and smoothness of motion on the parts laid on longitudinal bearings, and on stone blocks, in favour of the former. It is with pain we hear that the business between Mr. Walter and the company is not yet settled. We have nothing to say about the legal merits of the case; whatever may have been Mr. Walter's faults, they are not those of the heart, and it is to him almost alone the line owes its existence. Every honest man, every friend to the concern, must, therefore, sympathise with him, and feel that he has been dealt hardly with, in being driven to extremities. And just so much as this gentleman rises in public favour will the good government of the company sink in public estimation. It is, therefore, a matter of self-interest with the company to come to an amicable arrangement with him.

Great Western Railway.—The further distance from Maidenhead to Twyford, about nine miles, will be opened probably not before the beginning of July. A great increase has taken place in the traffic of this line. The receipts rose latterly from 1,500*l*. to 2,000*l*., but during the last week they have been 2,400*l*.; and the passengers, which had increased to 12,000, in the past week were 15,000.

Hull and Selby Railway.—We are glad to hear that such is the confidence in this property, that all the loans have been taken, and some offers obliged to be refused.

Halifax Branch Railway.—According to the evidence of the engineer of the Manchester and Leeds Railway, adduced before the Committee of the House of Commons, the length of this branch line is 1 mile and 51½ chains,

the steepest incline, 1 in 45: a tunnel of 20 yards is unavoidable, 18 feet high and 24 feet wide. The estimate of the branch is 83,000*l.*—*Halifax Guardian.*

Imperial Railway.—A meeting of the friends and supporters of the inland line of railway from Newcastle to Edinburgh was held in the Assembly-rooms, Newcastle, on Wednesday, the 1st of May, having been convened by the directors of the Newcastle and Carlisle Railway, on the suggestion of several influential parties who feel an interest in the promotion of such an undertaking. The meeting was most numerously attended, and comprised many proprietors of land on the line, as also deputations from Howick, Galashiels, and other places in Roxburghshire. John Fife, Esq., mayor of Newcastle, was called to the chair, and expressed his strong opinion in favour of a project which would confer upon Newcastle the advantages of a direct railway communication with Edinburgh and Glasgow.—Mr. Plummer, chairman of the Newcastle and Carlisle Railway company, said that the directors had not ventured to encourage the idea of using part of their railway as a line to Edinburgh until they had quite satisfied themselves that it was the best line for the promoters of the undertaking and for the public. There being no competition by water, all the mineral produce of the district must pass along this line when formed, and there could be no doubt whatever that the revenue from it would be very considerable, whilst it would be attended with great advantages to the public in general.—Mr. Scott, one of the deputation from Roxburghshire, observed that the landed proprietors on the other side the border viewed with deep interest the project of a railway through the interior of the country, which they would lend every assistance in their power to forward. The commissioners of supply of Roxburghshire had adopted a memorial to the Lords of the Treasury, praying them to appoint a competent civil engineer to examine the competing lines, and if the report was unfavourable to the Midland line, to abandon it; but if in favour of it, to use their utmost efforts to carry it into operation. Mr. Scott further observed, that he had reason to believe, the decision of the Highland and Agricultural Society of Scotland would be in favour of the inland line.—Mr. John Brandling thought that the West Coast line would go on, whatever was determined respecting either the Midland line or that by the east coast. The only question was, which of these two latter lines should be carried into effect. After some discussion as to the best course to adopt, a provisional committee was appointed, when Mr. Charton, jun., moved that it be an instruction to the committee to prepare a memorial to the Lords of the Treasury, praying them to appoint an engineer to survey the country and determine upon the best line of railway into Scotland. This proposition was not carried, it being considered more prudent to leave the committee unshackled. It was stated at the same time that there was some probability of a conference being held between Mr. Blackmore, the engineer of the inland line, and Mr. George Stephenson, the engineer of the East Coast line, when each gentleman might state his case, and submit the matter to a third party. Mr. Adamson and Mr. Stephen Reed were then appointed honorary joint secretaries, and votes of thanks having been passed to the directors of the Newcastle and Carlisle Railway, and the chairman, the meeting separated.—Abridged from the *Newcastle Journal*. [For the resolutions see our wrapper.]

Irish Railways.—The public is again threatened with this job. To our surprise, Mr. Bermingham, one of the most uncompromising of its opponents, has turned against the interests of Ireland and private enterprise, and, as it would appear by a circular of the General Irish Railway Com-

mittee before us, has gone in direct opposition to his duty to the parties he represented. We cannot understand this except being only the agent of a Lord, and finding himself afterwards in the company of a Lord (Lord Morpeth), and treated as a person of some consequence, his vanity smothered his judgment. But however unable Mr. B.'s solidity may have been to withstand the melting rays of the Noble Lord's blandness, we hope the General Committee and the English nation will not betray their interests to one of the most clumsy and mischievous jobs ever concocted for patronage and plunder. Had the scheme one good quality to recommend it, we should say, let it be tried. But no line, as we have abundantly shown in Nos. 36, 37, and 38, was ever laid out with so little probability of doing good, and so much certainty of doing unlimited evil. We hope, therefore, both Irish and English will unite against this abominable scheme. Common sense tells us the only rational way to do the country permanent good is to give due encouragement to private enterprise by judicious loans in some proportion to the private money advanced. But if nothing will satisfy the Government besides robbing this country to become railway jobbers, by all means let it be on a sound scheme, or one that will do good, not incalculable injury. We are so satisfied of the folly and mischief of the present plan, that we should be glad to see it upset by almost any measures.

Lancaster and Preston Railway.—At a late meeting of the proprietors, the chairman stated that there was only $\frac{1}{4}$ per cent. in arrear on the calls. Out of 142,000*l.* received they had expended 137,000*l.*, and there was a bill due for iron, besides expenses for rails, engines, carriages, &c., to be provided for. Under these circumstances a resolution was passed, authorizing the directors to raise on loan, at interest not exceeding 5 per cent., 83,000*l.*

Manchester and Birmingham Railway.—A special meeting was held in Manchester on the 6th ult., to consider the draft of the Bill at present before the Commons, John Brookes, Esq., in the chair. Mr. Buck, the engineer, estimated the savings by the deviations at 140,000*l.*, the increased expenditure at Manchester for a better situated and more commodious station at 40,000*l.*, so that 100,000*l.* would be saved. A chief part of the savings will be in the Congleton viaduct, which has been reduced 20 feet. By raising the Stockport viaduct 13 feet at one end, and 3 or 4 at the other, the cuttings on each side will be materially reduced, and Mr. Buck thinks it will effect an actual saving about 100,000*l.* Some severe observations were made on the opposition of the Grand Junction to the extension line. G. R. Chappell, Esq., said, having succeeded so far, they were determined, unless Parliament said they should not, to "have the Bill, the whole Bill, and nothing but the Bill." [We presume they will want something more, namely, the whole line.] The chairman said the Commons Committee were disgusted at being tied down for 23 days to the 459 frivolous objections, and would be more so by the continued opposition of a company making 20 per cent. "If the Grand Junction," said the Hon. Gentleman, "could take people for nothing, this company could too, and give them a bottle of wine into the bargain." [On these terms we beg to assure the company of our particular patronage and custom.]

That portion of this line now constructing within the borough of Stockport will contain no less than 26 arches, 20 of which will be thrown over streets, public highways, or viaducts.

Manchester and Birmingham Extension Railway.—The extension line passed the second reading May 14, by a majority of 48, or 139 to 91. The opposition to this Bill by Sir Eardley Wilmot, Mr. O. Gore, Lord Sandon, &c., rested on the ground of its being parallel to the Grand Junction, cutting up property, leaving the large town of Birmingham, &c., out, and

that the saving was trifling, being only $12\frac{1}{2}$ miles. Sir Robert Peel, on the contrary, said the distance would be shortened 13 miles in length, and 7 in radius, making 20, and that between the first and third largest towns in Europe. He said the proprietors of 34 miles out of 54 had assented, and that the neutral and those who had sent in no answer amounted to $5\frac{1}{2}$ miles more, leaving only $14\frac{1}{2}$ miles of dissents, which he thought in ten or twelve days might be reduced to 7. Mr. Poulett Thomson, Mr. Brotherton, and others, spoke on the same side; and the discussion was a very animated one.

Munich Railroad.—We understand from a correspondent at Munich that the greater part of the railroad between that town and Augsburg, 13 leagues in length, will be finished in July, and the remainder before the end of the autumn. The diligences, wagons, and locomotive engines, are already at Munich. The last have all been made in England, costing, one with another, about 72,000 francs a-piece.—*Morning Post*.

Manchester and Leeds Railway.—Between Rochdale and Littleborough the railway is in such a state of forwardness that an engine may pass. The first locomotive engine was brought upon the Rochdale station early in May.—*Halifax Guardian*.

Newcastle and Carlisle Railway.—[TO THE EDITOR OF THE RAILWAY MAGAZINE].—Sir,—In the notice in your last number of the Newcastle and Carlisle Railway, you say that you believe the line was constructed without any engineer. I beg leave to say that your belief is erroneous, as I had the honour of being appointed engineer to that work in the year 1833, and still continue to perform the duties of that office in a manner which I have reason to believe has been, and I hope will always be, satisfactory to the committee of directors and the company at large.

The making up of the annual accounts is the business of the secretary, and you appear, by your statement, to understand them very well, notwithstanding your complaint of their want of clearness.

I am, Sir, your most obedient servant,

Newcastle-on-Tyne, May 9th, 1839.

JOHN BLACKMORE.

•• Our information respecting the construction of the line, without an engineer, was from one of their own shareholders, and two other railway gentlemen. We believe we also heard it given in evidence in the House. It was stated to us that Mr. Nicholas Wood, the author of the "Treatise on Railroads," Mr. Thompson (we believe), and another gentleman, formed a committee to carry on the works. If we have been in error it is not our fault; our mention of the circumstances was for the credit of the management. Mr. Blackmore will find, on looking again, that we did not write the article to which our remark on the accounts is appended. The article was written by a gentleman much better acquainted with the subject. There was something out of the ordinary course in the debentures that we could not clearly see, and hence the cause of our observation; but not the slightest reflection was meant on the two respectable gentlemen who officiate as secretaries.

Nicolai Steamer.—In our last we stated, upon information given us, that this vessel had been built at the expense of the Russian Emperor. It is a mistake; she was built by the Petersburg and Lubeck Steam Navigation Company in the short space of 23 weeks. Her length between the perpendiculars is 185 feet; breadth under the wales 29; depth of hold $17\frac{1}{2}$; draught of water with a full load of coals and cargo $11\frac{1}{2}$; diameter of paddle-wheel 24; measurement 750 tons; and engines 240 horse-power. She was built by Mr. John Taylor, of Barking, from the designs of Messrs. Ritherdon and Carr. The machinery was constructed by Messrs.

Seaward and Capel, on the plan of the Gorgon's engines, and occupies, with the coal, a length in the vessel of only 45 feet. The boilers, two in number, are placed side by side; and the boxes hold 120, but could easily be increased to 250 tons of coal. Owing to the compactness of the machinery, the accommodations for passengers are excellent. 120 separate berths with saloons, separate staircases, &c., are fitted up for first and second-class passengers, and 22 for third. Her engines weigh 70 tons, and cost 12,000*l*. The total cost of the vessel altogether is 29,000*l*. She made an experimental trip on May 1st, down the river, having on board a number of naval and scientific gentlemen. The object of the trip was not to try her speed—for her steam was not up for an hour after she started, and she was so light for want of loading that the water, when she was at rest, did not cover the lowermost of the paddles—but a mere pleasurable trip to see how the machinery would work. She started off the East India Docks at 11h. 49m. a.m., and reached Gilby's-mill, about a mile below Gravesend, at 2h. 23m. p.m., turned round, and was off Blackwall at 4h. 55m. A more pleasant trip we never took, and so said the gentlemen generally, among whom were several from the Trinity House, the Astronomer Royal, Professor Forbes, Mr. Herapath, &c. &c. The machinery and its action were the theme of general praise.

Newcastle and North Shields Railway.—On the 22d May the directors made an experimental trip on a portion of the permanent line, with one of the splendid new engines. The rails, which are laid on continuous bearings, were found perfectly substantial and satisfactory, and it was observed that the motion of the carriages on the line was exceedingly smooth and agreeable. The 18th of June is fixed for the general opening.—*Newcastle Journal*.

Newcastle and Carlisle Railway.—On the 21st May that portion of the line between Blaydon and the company's depot near the Shot Tower, Newcastle, was opened for traffic amidst a great concourse of spectators, by the directors, accompanied by the engineer, J. Blackmore, Esq., and the principal contractors. The train moved slowly along the line, crossing the river Tyne by the new bridge at Scotswood, and arrived at the Newcastle station about 1 o'clock.—*Newcastle Journal*.

North Midland Railway.—The open cutting through the town of Belper is expected to be completed in about four months. The bridges over the several streets and lanes are commenced, as are also the retaining walls, for which a great quantity of stone is prepared. The bridge for the new turnpike-road, north of Belper, is completed, and will soon be ready for use. The passage under the bed of the Cromford-canal at Bull-bridge has been open for some time, and the works are proceeding with great activity. The last of the foundations of the large bridge over the Derwent, near Amber-gate, was put in last week; considerable difficulty has been experienced here, as the workmen have been many months, night and day, at work, assisted by a powerful steam-engine.—*Derby Mercury*.

Preston and Wyre Railway.—We understand Mr. George Stephenson is become the engineer to the above railway. For some weeks past the works at the Preston end of the line have been carried forward with great activity. We understand that the operations on other parts of the line have also, of late, been conducted with greater spirit than heretofore. A great number of men are at present employed on the line adjacent to the Fylde-road.

Preston and Longridge Railway.—The workmen are progressing actively on this line with the work at the east-end. They are cutting near the

stone-quarries of Tootle Height, and preparations are making for laying the line with gravel previously to placing the rails. The viaduct near the commencement, and the bridge at the Alston-four-lane-ends, exhibit a superior style of design and beauty combined with strength and firmness. It is expected that this line will be opened at the end of the summer.—*Bolton Chronicle*.

Sheffield and Rotherham Railway.—The following is a return of the number of persons who have been conveyed on this railway from its opening in November last, to the 1st of May, a period of six months:—From Rotherham, 101,952; from Sheffield, 97,912; from intermediate stations, 4,173; making a total of 204,037 persons, and showing that a greater number of persons by 4,040 have been taken from Rotherham than from Sheffield.—*Leeds Intelligencer*.

Sheffield and Manchester Railway.—[Compensation cases]:—On the 30th April and the two succeeding days, a Sheriff's Court was held at the Tontine Inn, Sheffield, to assess damages in the following cases:—Mr. John Middleton, Mrs. Middleton (his wife), and Mr. M. Johnson, trustees under the will of the late Mr. Amos Green, claimed 2,914*l.* 9*s.* 2*d.* for 13,728 yards of land required for the Sheffield terminus; the company had offered 2,258*l.* 6*s.* 8*d.*, and the verdict was for 1,893*l.* 12*s.* 6*d.* Mr. John Tinker, of Carcoates, near Thurston, claimed 1,060*l.* for 5 acres, 18 perches of land and damage; the company offered 150*l.*; the jury's verdict was, for the land, 123*l.* 0*s.* 7½*d.*; damages, 60*l.*; total, 183*l.* 0*s.* 7½*d.* The trustees under the will of the late Mr. John Greaves claimed 1,067*l.* for 5 acres, 4 roods, 24 perches of land (2 roods 18 perches of which was through a plantation), at Ranah, near Penistone; the company had offered 700*l.*; verdict, for the land, 470*l.*; for damages, 300*l.*; plantation, 66*l.*; and 20*l.* for the moor land. The following verdicts were taken by consent:—John Spencer Stanhope, Esq., of Cannon-hall, for land, 200*l.*; severance, 100*l.*: Earl Scarborough, 200*l.*: Mr. Wm. Denton, 160*l.* for land, 40*l.* for severance: Mrs. Elizabeth Denton and others, 48*l.* for land, 20*l.* damages: Mr. Wm. Denton and others in remainder, for land, 141*l.*, damages 61*l.*: Mr. Joseph Hague, 180*l.* These cases concluded the purchases of land for the whole length of the line by the company, and it is satisfactory to state, that the amount is less by 20,000*l.* than the Parliamentary estimate.—*Sheffield Mercury*.

South-Eastern Railway.—The report of this company, which held their general meeting May 8th, T. W. Tindale, Esq., in the chair, is in another part of our journal. At this meeting was mentioned the terms of the arrangement with the Brighton Company, which we gave two numbers since—in No. 38. It was resolved unanimously, on the motion of Mr. Hankey, at this meeting (see the resolutions on our wrapper), that the directors should enforce the payment of the calls, and not proceed to forfeit, without the sanction of a special general meeting called for the purpose. Mr. Cubitt, the engineer, said that, judging from what had been done, there was reason to believe the whole works would be constructed considerably under the estimates. The most remarkable feature of this meeting was, a series of questions put by a Mr. Richard Tyrrell, the representative of five shares. It was uncertain whether Mr. T. understood his own questions, or whether he had been especially crammed for the purpose; but it was quite certain many of them no other person understood. Mr. T. arrived at the climax of estimation with the meeting, by founding questions upon charges made against the two most efficient and zealous officers of the company (we believe, the secretary and solicitor), in one of the notorious unstamped papers. "He further could not go," and the meeting evinced their

feelings by a *special vote* of confidence in the directors, carried by acclamation. A special meeting was immediately afterwards held, to consider the draft of the Bill for the deviation, which was approved.

We are glad to perceive by the advertisement on our wrapper, that the whole line from Dover to Folkstone, including the bridges over the turn-pike-roads near the latter place, are in active operation. The works, preparatory to the contracts, have been executed by the company's engineer. Near Penshurst-park, on the line between Tonbridge and the Brighton Railway, considerable tracts of land have been fenced off. The cuttings and embankments are in full work.

Taff Vale Railway.—It is with pleasure we announce the completion of the Ynys Coed tunnel, near Nantygaw, which took place at eleven o'clock, on Friday, the 26th of April. The works have been executed under the superintendence of Mr. Richardson, surveyor to the contractors, and Mr. Emett for George Bush, Esq., the engineer to the company. It is worthy of remark, the last length or meeting, 12 feet 6 inches, was completed in ninety-seven hours.—*Merthyr Guardian*.

Thames Tunnel.—The works in this tunnel are progressing with success; it now extends to more than 880 feet in length, and is completed to within a distance of less than 40 feet from Trinity low-water mark on the Middlesex shore.

Talacre Coal Company.—We understand this company have purchased a tract of 2,000 acres of land in Flintshire, under which lie two seams of excellent coal, besides iron, which, by admeasurement, comprise 37,981,250 tons; enough, at 300,000 tons a-year, to supply Dublin and its vicinity for 200 years to come. The first seam, 4 yards thick, lies only 15 yards from the surface; the second, 2 yards thick, lies 74 yards deep. It has been calculated that the profit on this article alone, at about half the actual amount, will realize 6,000,000*l*. The profits of the iron are also enormous.

York and North Midland Railway.—This line of railway, from the terminus at York to the junction with the Leeds and Selby Railway, near South Milford, will be opened immediately to the public, thereby forming an uninterrupted railway communication between York and Leeds and York and Selby.—*Sheffield Independent*.

The 30th of May is the day fixed for opening about one-half the entire length of this line.

Zarsko-Selso Railway.—We hear that on the first six months of this line, a dividend of nine per cent. has been divided.

Eastern Counties Railway.—This line will be opened from Dog-row, about one mile from the London terminus, to Romford, eleven miles, on the 18th of June.

The public have seen with disgust and contempt the iterated annoyance given by the ex-secretary's paper—now under the sole control of himself, the world should know, and that of one John Evans, the "respectable" forty shillings "gentleman's" attorney in *Robertson v. Wyld*, both men of "high" character,* to use the X's language—to the directors,—not for the management of the concern since X has blessed the company with his exit, but in matters of the most contemptibly frivolous nature. For instance, there was first the *BALLOT*. A mandamus was to be instantly obtained, the directors, of course, turned out, and we suppose the "high character" X, to be restored as sole director, and his brother, who decamped, his own

* Does the X here mean this word to be in the Epicurean sense, that is, in the sense in which it is applied to half putrid meat, game, &c.?

paper says, for "theft, swindling, and forgery," as accountant, banker, and treasurer of the company. By some means this mandamus, whose conception was so pompously announced, has never come forth; we suppose the parturition has been difficult. Now, however, a new scheme is afloat. A little time since, the X travelled, we believe, into the eastern counties, and shortly afterwards an application was made in the Bail Court (May 6), and from the good-natured judge, unacquainted no doubt with the company's Act, a rule obtained *nisi*, on *ex parte* statements, to show cause why a mandamus should not be issued to compel the company to set out their line and go on to Norwich and Yarmouth, instead of stopping at Colchester. This application was ostensibly by Mr. Symonds, Mr. Fowlings, &c., said to be shareholders, but whose names, we believe, are not on the company's books. In the same court, May 8th, another attempt was made by a Mr. Tipper, for a similar rule, to compel the company to summon a jury to assess the value of, and compensation for, certain premises of his, which the company had given him notice they might want. We really here suspect that the X has made a complete butt of the counsel and all the other parties; for more empty-pated applications have never been entertained in the court, as we shall now show, in the same manner we did in the ballot case.

Sec. 254. p. 157 of the company's Act says, "And be it further enacted, that if the said land, or any part thereof, shall at any time hereafter be *abandoned* or *given up* by the said company, * * * then, and in such case, the lands so authorized to be and so *purchased* or taken, * * shall pass, revert to," &c., the owners of land on each side in equal moieties.

Here, it is obvious, the company may take, and even purchase (pay for or not as they like) lands, and give them up or abandon them afterwards. Can any one above an idiot or a wilful cur, suppose they cannot do it much easier before?

Again, sec. 222, p. 139, it is enacted, "that unless the said company shall, within the space of two years, * * agree for, or cause to be valued and paid for, as herein mentioned, the lands they are by this Act empowered to take or use," their powers of taking it compulsorily shall cease. Clause 223 is still stronger. "And be it further enacted, that in case the said railway and works shall not have been made and completed * * within the space of seven years," * * then all the powers, &c., of the Act shall cease, "except as to so much (if any) of the said railway and works as" shall have been "certified to have been completed."

The first of these clauses grants the power to take land within a given time, but says that, if not so taken, it shall not be afterwards, thus clearly recognising the negative power of not taking it if the directors so please. The second goes further, and obviously admits that they may make as much as they like, or none at all, of the line. Indeed the whole matter is so piteously absurd, that we can hardly comprehend any man publishing such a thing, unless it be one who glories in proclaiming for his principle, "*that a LIE current, and uncontradicted for a week, is as good for all purposes of present effect as the best TRUTH ever promulgated.*"

What view a judge may take of this case it is impossible to foresee, but if it be law that a company must be compelled to proceed whether they have funds or not, it is high time such a law should be altered. In Mr. Tipper's case, it depends entirely whether the notice (as it is called) was given to him before or after the Act was obtained. If before, we think Mr. T.'s

chance of success is as 1 to 100 million : if after, and he has sustained any injury therefrom, we presume the company are bound to make it good ; but that a court will ever compel the completion of a mere inchoative proceeding into a contract, we must see before we can believe it.

May we ask why the X's dear friend, sole associate and coadjutor, Mr. John Evans, does not tell him better? Pray is this Mr. E. the "gentleman" who incorporated within his own single person all that company—directors, officers, solicitors, shareholders, and appurtenances thereunto belonging—which once offered (?) the Eastern Counties 20,000*l.* a-year to be allowed to make the line between Norwich and Yarmouth? If so, we grant he is an important multitudinous personage, and, with all due humility, we beg to ask, why he does not now snap at this invaluable piece of the line, (which we suspect he may have for 10,000*l.* or 5,000*l.* a year,) and make his own fortune, and his friend, the Secretary's, by it?

Joking apart, if the X has really anything to allege against the present directors as a body, why does he not boldly do it? Why go sneaking about to annoy them by little and pitiful actions? We have it from the best authority, that the letters signed "Vigil" are written by the X himself. Is it not, therefore, disgusting to see him, week after week, humbugging the public in his paper with—"the letter of 'Vigil' has been received"—"we postpone at the request of 'Vigil' " his letter—"will 'Vigil' inform us whether he now wishes his letter to be inserted?"

By the by, we have received a long account of the past exploits of this "respectable gentleman" from a quondam friend of his. We assure our readers it is very rich, and yet will keep a little. "THE BRADFORD WEAVERS' SUBSCRIPTION," in particular, is as "high" as any Epicurean could wish it.

Since writing the above, "Vigil" (that is, X) has consented to appear, and has been by X permitted to!! How very kind it is of X! Perhaps the public has never been insulted with a more indecent piece of audacious impudence than this attack contains. Can anything more disgusting be imagined, than for a man, after he is out of office, to quote, and turn round upon his directors, on a report he himself drew up, and cajoled them to adopt, while he was in office? Whatever may be "the extravagant remuneration to the directors," as he calls it, surely he of all men should be the last to arraign the sum his friend Mr. Heath, at his own suggestion, we believe, proposed. We just hint with how much better grace it would come, if he would first refund a part of his own large salary for the period he complains of, and particularly the 841*l.*, for which his brother and the two other clerks he introduced into the company's employ, have decamped, before he talks of what others have been receiving. His attack on the present board and Mr. Hall is natural enough; but the shareholders understand it too well to waste a thought upon it. He would amuse the public much more if he would enlighten it a little upon his former secretaryships, and tell us something about the Weavers' subscription list.

LAW CASES.

Randal v. Commercial Blackwall Railway.—[Vice-Chancellor's Court, April 23d]:—Mr. Jacob moved to dissolve an injunction on the ground of irregularity, which had been granted *ex parte*. The plaintiff received notice in August last from the defendants that they should require his leasehold houses for the railway; a contract was entered into for the sale of the houses at 900*l.*, and things were going on for the completion of the purchase. In the course of the month the company commenced to pull down

the houses without notice or tender of payment. Under these circumstances the injunction was obtained. His Honour, after detailing the circumstances, discharged the injunction without costs.

City and Richmond Railway.—[Rolls Court, May 24th, *Busk v. Beetham and others*].—Beetham, who was the solicitor to the company, had brought two actions against Busk, one against him solely as one of the directors, and the other against him in conjunction with other directors, for the balance of his account. Busk having obtained an injunction to restrain Beetham's proceeding in these actions, the latter obtained an order *nisi* for dissolving it, against which cause was now shown. The company was concocted by Laxton, a surveyor, and Blunt, a civil engineer, and Beetham's original bill was 16,059*l.*, of which he had received part, and now claimed a balance of 9,517*l.* Such a system was exhibited in the company's transactions, that Lord Langdale could not help expressing his great surprise that the parties had thought fit to bring forward, in a court of justice, such a series of deceptions and frauds, and made the order for dissolving the injunction absolute.

Queen v. the Eastern Counties Company.—[Bail Court, May 6th].—The Attorney-General applied for a rule, on behalf of Mr. Symonds, Mr. Fowler, and other shareholders, to show cause why a mandamus should not be issued against them to compel them to carry the line on to Norwich and Yarmouth, conformably to their Act, and to limit the line to Colchester as intended. Mr. Justice Williams having heard the *exparte* statements by which it was pretended the company's Act was imperative, granted the rule. The rule will probably be argued in the course of the term.

The Queen v. the Eastern Counties Railway Company.—[Bail Court, May 8th].—Mr. Butt applied, on the part of a person named Tipper, for a rule calling upon the defendants to show cause why a mandamus should not issue commanding them to summon a jury, to assess the amount of compensation for certain premises belonging to the applicant; the company having given notice that the premises should be required for the railway. The premises had not actually been taken in this case by the company. Rule granted.

Hull and Selby Railway.—[Exchequer Equity Sittings, May 23d].—The petitions of Broadley and others. This was a question as to property taken by the railway on the fore-shore, the company having paid the money into court. The crown claimed the property in question on the ground of its lying between high and low water mark. After much discussion it was arranged that the point of law should be stated in a special case for the opinion of the full court, and the further hearing was thereupon postponed.

Great Western Railway.—Mandamus. May 3d. A Mr. Farlow obtained a rule *nisi*, to show cause why a mandamus should not be issued compelling the company to summon a jury to compensate him for injury done by the company's operations to his land.

London Grand Junction Railway.—This company, in the Common Pleas, May 14th, brought an action against Mr. Freeman, not an original proprietor, but one who had purchased shares in the market, to recover an arrear on a call. It was objected that the defendant's name was not registered in the company's books in the form prescribed by the Act, and the Judge thereupon directed a verdict to be found for the defendant, with leave to the plaintiffs to move to enter a verdict for themselves. Mr. Justice Colman presided.

Manchester and Leeds Railway.—[ats. Webb, Court of Chancery, May 9].—The Lord Chancellor said, as it appeared from the report of the

engineer to whom the case had been referred that the whole of the land bought by the company was not necessary, he should confine the precept or assessing the value accordingly. The injunction would continue as to ll, except that contained and specified in the report.

[The Queen v. the Directors of the Southampton Railway Company, Court of Queen's Bench, May 1]:—A rule for a *mandamus* had been obtained to command the defendants to issue their warrant for the Sheriff to hold a court to assess the damage claimed by a Mr. Francis, in respect of some land that had been taken from him. It was contended that Mr. Francis had no title, as he had not suffered any injury, his term having expired, and he subsequently having received a counter-notice, declaring that his premises would not be required. Lord Denman, in delivering judgment, said, as Mr. Francis had not been promised a renewal of his lease, or expended money on improvement, the rule must be discharged.—Rule discharged.

PARLIAMENTARY PROCEEDINGS.

HOUSE OF COMMONS.

BALLOCKNEY, April 30, report to be taken into further consideration on Thursday, at five o'clock; May 2, rep. further considered; (prints having been delivered upon Thursday, April 25,) amendments agreed to; Bill to be engrossed; May 3, read a 3d time, and passed.—BISHOP AUCKLAND AND WEARDALE, May 1, two pets. of landowners on the line, against; ref. to the Committee; counsel ordered.—BRISTOL AND GLOUCESTER, April 29, rep. to lie on the table, and to be printed: May 7, rep. further considered, (prints having been delivered upon Thursday, May 2); amendments agreed to; clauses added; Bill to be engrossed: May 13, read 3d, and passed.—COMMERCIAL (LONDON AND BLACKWALL), April 30, pet. of the Rev. John Letts, against; ref. to the Committee; counsel ordered: May 7, leave given to print the evidence from the Committee clerks' office, at the expense of the parties, if they think fit.—DUBLIN AND KINGSTOWN, May 15, returns ordered "of the several sums of money (exceeding 100*l.* each) which have been awarded, by way of compensation, to the different claimants on the Dublin and Kingstown Railway, specifying the name of each claimant, and the sum originally demanded, and the amount awarded and paid." (Colonel Perceval).—EDINBURGH, LEITH, AND NEWHAVEN, April 25, pet. of shareholders in the Company against; ref. to the Committee; counsel ordered: April 26, pet. of George Wright, Esq., against; ref. to the Committee; counsel ordered: April 30, two pets. of proprietors of shares, in favour; to lie on the table: May 13, reported; rep. to lie on the table, and to be printed: May 15, pet. of the feoffees and governors of Heriot's Hospital, Edinburgh, against; to lie on the table.—GREAT CENTRAL IRISH (CELLRIDGE AND MULLINGAR), April 29, pet. for further enlarging the time to present a pet. for a Bill till Friday, May 10, ref. to the Select Committee: May 3, pet. for leave to present a pet. for a Bill; reported; leave given; pet. pres. accordingly; ref. to the Select Committee.—GREAT NORTH OF ENGLAND, April 30, rep. to be taken into further consideration on Thursday, at five o'clock: May 2, rep. further considered, (prints having been delivered on Monday, April 22); amendments agreed to; clause added; clause offered (making it compulsory on the Company to finish part of the line within a limited time); brought up and read 1; motion made and question, "That the clause be read a 2d, put and negatived; Bill to be engrossed: May 3, read 3, and passed.—GREAT WESTERN, April 30, rep. further considered (prints having been delivered on Thurs-

day, April 18); amendments agreed to; clause added; Bill to be engrossed; May 1, read 3d, and passed.—LONDON AND BIRMINGHAM, May 2, ordered, that the evidence taken before the Committee on the company be printed; May 6, pet. of the company, praying that the clauses inserted by the Committee, providing how the additional capital required shall be raised, may be expunged; to lie on the table, and to be printed: May 7, pet. of lessees, owners, and inhabitants of houses and property in Camden-town, for a station at Southampton-bridge, Oval-road, Camden-town; to lie on the table; rep. taken into further consideration on Tuesday next: May 14, return pres. of the hours of arrival and departure of the Birmingham mails, &c., rates of travelling required on railways, and penalties on railway companies, ordered March 13 and 19, to lie on the table; May 14, rep. further considered (prints having been delivered on Wednesday, April 24); amendments, as far as clause 2, agreed to; amendment proposed, to leave out the second clause (power to raise money by the creation of new shares); motion made, and question, "That the clause stand part of the Bill," put, and negatived; another amendment proposed, in clause 11, to leave out the words, "and such order of time shall be denoted by tickets, numbered 1, 2, 3, and so on, to be delivered to the parties bringing such goods at the entrance gate of the respective stations of the said company;" question put, "that the words proposed to be left out stand part of the clause;" the House divided, ayes, 5; noes, 17: May 15, rep. to be taken into further consideration on Tuesday, May 28.—LIVERPOOL AND MANCHESTER (EXTENSION), April 26, rep.; report to lie on the table, and be printed; rep. further considered (prints having been delivered on Wednesday, April 24); amendments agreed to; clause added; Bill to be engrossed: May 13, read 3, and passed.—LONDON AND CROYDON, April 30, rep. further considered (prints having been delivered on Monday, April 22); amendments agreed to; amendments made; clause added; Bill to be engrossed: May 3, read 3, and passed.—LONDON AND SOUTHAMPTON (PORTSMOUTH BRANCH), April 30, rep. to be taken into further consideration on Thursday, at five o'clock: May 2, rep. further considered (prints having been delivered on Thursday, April 25); amendments agreed to; amendment made; clause added; Bill to be engrossed: May 3, read 3, and passed.—LONDON AND GREENWICH, April 30, rep. to be taken into further consideration on Thursday, at five o'clock: May 2, rep. further considered (prints having been delivered on Thursday, April 25); amendments agreed to; amendment made; clause added; Bill to be engrossed: May 3, read 3, and passed.

MANCHESTER AND BIRMINGHAM EXTENSION (Stone and Rugby), April 25; pet. of gentry, merchants, bankers, and others, of Burton-upon-Trent, in favour; to lie on the table: April 29, rep. [April 24] from Select Committee on Standing Orders read; Bill ordered to be brought in by Lord Francis Egerton and Mr. Bootle Wilbraham, leave given to present the Bill on or before Thursday next; pet. from Alrewas in favour of the application, to lie on the table: May 1, for making a railway from the Manchester and Birmingham, in the parish of Stone, in the county of Stafford, to join the London and Birmingham, in the parish of Rugby, in the county of Warwick, to be called the Manchester and Birmingham Extension, with a branch therefrom, pres.; read 1; to be read 2d: May 2, pet. manufacturers, tradesmen, and inhabitants of Nantwich, in favour; to lie on the table: May 6, pet., in favour, from Burnley, Huddersfield, Stockport, Blackburn, and Rochdale; to lie on the table: May 7, two pets. from Clitheroe in favour; to lie on the table: May 13, pets. against, from Sir Geo. Chetwynd, Bart., landowners, and others, of Oakham, and bankers and others of Uppingham; to lie on the table: pet. in favour from Oakham, to lie on

the table: May 14, pet. against from bankers, merchants, inhabitants, and others, of Grantham, Loughborough, Leicester, Stratford, Lutterworth, Dudley, Birmingham, Sheffield, Derby, Boston, Wolverhampton, Leek, Peterborough, Walsall, Coventry, Belston, Westbromwich, Darlaston, Wednesbury, Lincoln, Kettering, owners and occupiers of land on the line, Sophia-place, London and Birmingham Company, Corporation of Derby, Corporation of Stratford, Mayor and Corporation of Walsall, and Rev. J. Roberts; to lie on the table: pets. in favour, from Lichfield, Ashton-under-Lyne, Staffordshire Potteries, Bolton, Chester, Bury (Lancaster), Harts-horne and Gresley Potteries, Newcastle-under-Lyne, Stone, and Preston; to lie on the table; read 2d; and committed to Mr. Edward Buller and the North Stafford list: May 15, pets. of Sophia-place, the Rev. J. Roberts, and owners and occupiers on the line [pres. May 14]; ref. to the Committee; counsel ordered; pets. against, from John George Norbury, Esq., S. W. Henslow, Esq., and Sir George Chetwynd, Bart., Midland Counties Railway Company, Company of Proprietors of the Navigation from Trent to the Mersey, Birmingham Railway Company, and the Earl of Harrowby; referred to the Committee; counsel ordered.

MANCHESTER AND BIRMINGHAM, May 13, rep. that at the expiration of one hour from the time fixed for the adjourned meeting of the committee this day, only two, the selected members, were present (three being the quorum appointed by the Committee of Selection) and that the committee in consequence, adjourned till to-morrow, at twelve o'clock, committee revived, leave to committee, to sit and proceed to-morrow.

—MANCHESTER AND LEEDS, April 25, pet. against ref. to the committee, counsel ordered: April 26, pet. against, from the Rev. James Croak, and the Rev. Thos. Parker, and John George Smith, Esq., ref. to the committee, counsel ordered: April 29, pet. from Wakefield in favour, to lie on the table: April 30, power to committee to send for person, papers, and records: May 15, rep.; rep. to lie on the table, and to be printed.—MONKLAND AND KIRKINTILLOCK, April 30, rep. to be taken into further consideration, on Thursday, at 5 o'clock: May 2, rep. further considered, [Prints having been delivered upon Thursday, 25th April,] amendments agreed to, Bill to be engrossed; May 3, read 3d, and passed.

NORTHERN AND EASTERN, May 13, (No. 1), reported; rep. to lie on the table and to be printed.—NORTHERN AND EASTERN (No. 2), April 26, pets. against from Wm. Ingle, Esq., and others, George Frere, and commissioners of the metropolis turnpike-roads north of the Thames, ref. to the Committee; counsel ordered: April 29, pet. of the East London Waterworks Company against; ref. to the Committee; counsel ordered: May 2, pet. of the minister, churchwardens, overseers, vestry, governors and directors of the poor of St. Matthew, Bethnal-green, against [pres. 12th April], ref. to the Committee; counsel ordered; minutes of evidence taken before the Committee on the Northern and Eastern Company, in the session of 1836, ref. to the Committee on the Bill: May 15, rep. ref., to lie on the table and to be printed.—NORTH MIDLAND, April 29, pet. of Earl Fitzwilliam against, to lie on the table: April 30, rep. further considered [prints having been delivered up on Thursday, 18th April]; amendments agreed to; clause added; Bill to be engrossed: May 1, read 3d, and passed.

PRESTON AND WYRE RAILWAY AND HARBOUR, AND PRESTON AND WYRE DOCK, April 25, pet. of Frederick Kemp against, ref. to the committee on the Bill, counsel ordered: April 29, power to committee to send for person, papers, and records: May 6, rep.; rep. to lie on the table.—RAILWAY BILLS, pet. of Henry Collinson, for the insertion of clauses in

railway Bills for removing the difficulties which prevent the public from running carriages for hire on railways [pres. 18th April], ref. to the Select Committee: April 26, power to report opinion and observations together with minutes of observation from time to time: May 6, pet. of merchants, traders, and manufacturers of London, for making provision in all Railway Bills enabling the public to run carriages for hire on railways, and for restoring free competition in carriage of goods, ref. to the Select Committee: May 15, return ordered, "in a tabular form, of the qualifications for directors of railroad companies, required under the several Acts authorizing the making of railroads since the first year of the reign of his late Majesty, King William IV; also stating the nominal value of each of the shares constituting such qualification, and the alterations, if any, in the amount of qualification made by the Act subsequent to the original Act for making such railroads respectively, and the number of directors authorized to be appointed for the conduct and management of the concerns of each respective railway, and what number of directors in each company, and qualified, in respect of original shares only, or of subsequently created shares only, or partly by the one class, and partly by the other (*Mr. Freshfield*); pet. of Aldborough Hennicker, Esq., of Gray's-inn, barrister, for placing conductors and servants of railway companies under similar control with the conductors and drivers of public conveyances in the metropolis, to lie on the table; pet. from Edinburgh for enabling the public to run carriages for hire thereon, ref. to the Select Committee.

RAILWAYS (IRELAND).—April 25, pets. praying the House to sanction the advance of loans, to aid the existing companies in prosecuting their respective lines, from Banbridge, Newry, Warrenpoint, Lisburn, and Templemore, to lie on the table: April 30, rep. thereon deferred till Monday next, May 1; two pets. from Mayo, for including the province of Connaught in the proposed measure; to lie on the table: May 2, alphabetical list pres. of names of persons through whose property the proposed line between Dublin and Cork and Limerick is intended to pass, [ordered, 9th April,] to lie on the table: May 6, pet. of the shareholders and proprietors of the Great Leinster and Munster Railway company, against the proposed measure, to lie on the table; rep. thereupon deferred till Monday next: May 13, rep. thereupon deferred till Monday, May 27: May 15, pet. from Cloukee and Castlerahan, for granting assistance to private companies, to lie on the table; rep. thereupon deferred from Monday, May 27, till Tuesday, May 28.

SOUTH-EASTERN (Reigate), April 25, pet. Joseph Coulstock and others, that the company be allowed by their Bill to divert their line; ref. to the committee: pet. of Sir William Weller Pepys, Bart., and others, that the company may not be allowed to divert their line; ref. to the committee: April 29, pets. in favour from Sir William Robert Clayton, Bart., James Alexander, Esq., Walter Durrant, John Wells, Thomas Whitebread, and William Ward and Frances Ann Ward, to lie on the table: April 30th, pet. of the company praying that it be an instruction to the Committee that they have power to substitute another line for which notices were given in November last; to be taken into consideration on Thursday, and to be printed: May 2, pets. for authorizing a deviation in the line to join the Brighton, from landowners of Tonbridge, inhabitants of Ashford, Sandgate, Tonbridge Wells, Leigh, Dover (two pets), Ashford, Edenbridge, Staplehurst, Westerham, Hythe, Folkstone, Tonbridge, Rye, owners and occupiers of land in Kent, and the Brighton Railway Company; to lie on the table: May 2, pet. of the company praying that it be an instruction to the committee that they have power to substitute another line, for which

notices were given in November last [pres. 30 April] read: pet. for Bill [pres. 11th Feb.] read: May 14, rep. to be engrossed: May 15, read a third time and passed.—SOUTH-EASTERN (No 2), May 3, pet. for Bill to be taken into consideration upon Monday next and to be printed: May 6, pet. for Bill [pres. May 3d] considered: Bill ordered to be brought in by Sir Edward Knatchbull and Mr. Law Hodges; to alter and divert the line of the South-Eastern Company from a point thereon, in the parish of Cheddington, in the county of Kent, so as to join the London and Brighton at or near Redstone-hill, in the parish of Reigate, in the county of Surrey; pres. read 1st, to be read 2d.—SLAMANNAN, April 26, leave given the Committee to sit this day till half-past four o'clock, during the sitting of the House: May 7, rep., clause added, rep. to lie on the table and be printed.—WISHAW AND COLTNESS, April 30, rep. to be taken into further consideration on Thursday, at five o'clock: May 2, rep. further considered [prints having been delivered upon Thursday, 25th April], amendments agreed to, Bill to be engrossed: May 3, read 3d and passed.—WEST DURHAM, April 29, rep.; rep. to lie on the table and to be printed: May 7, rep. further considered [prints having been delivered upon Thursday, 2d May], amendments agreed to, clause added, Bill to be engrossed: May 14, read 3d and passed.—May 28, NORTHERN AND EASTERN, postponed until the 30th, for want of the general clause recommended by the Select Committee.—COMMERCIAL BLACKWALL, leave to Committee to sit until five, while the House sits.—SLAMANNAN, read 3d and passed.—MANCHESTER AND BIRMINGHAM EXTENSION, Manchester extension, pets. against.—BIRMINGHAM, rep. further considered; amendments agreed to; clauses added; amendments made; Bill to be engrossed.

HOUSE OF LORDS.

BALLOCKNEY, May 2, read 1st: May 7, read 2d; committed for Monday next: May 10, pet. of trustees on the turnpike-road leading from Glasgow to Redburn bridge, by Cambernauld, praying to be heard by counsel against; read, and ordered to lie on the table; the order for the Committee to meet on Monday next discharged, and Bill ref. to the Standing Orders Committee on Tuesday next: May 15, rep. from the Standing Orders Committee, and Bill committed; the Committee to be proposed by the Lords' Committees appointed for proposing Committees on opposed Bills.—BRISTOL AND GLOUCESTER, May 14, read 1st, and ref. to the Standing Orders Committee, on the first sitting day after the recess at Whitsuntide.—GREAT NORTH OF ENGLAND, May 2, read 1st: May 7, read 2d, and committed for Monday next.—GREAT WESTERN, May 2d, read 1st: May 6, read 2d, and committed for Friday next: May 14, rep., with amendments: May 15, read 3d, with amendments, amendments made, Bill passed, and sent to the Commons.—LONDON AND CROYDON, May 2, read 1st: May 7, read 2d, and committed for Monday next: May 14, rep. specially without amendment.—LONDON AND GREENWICH, May 2, read 1st: May 7, read 2d, and committed for Monday next: May 14, read 3d, and passed.—LIVERPOOL AND MANCHESTER (EXTENSION), May 14, read 1st, and ref. to the Standing Orders Committee, on the first sitting day after the recess at Whitsuntide.—LONDON AND SOUTHAMPTON, May 10, rep. specially from the Standing Orders Committee, and leave given to proceed with the Bill: May 13, read 2d, and committed for to-morrow: May 14, repd. with amendments: May 15, read 3d, with amendments, Bill passed, and sent to the Commons.—MONKLAND AND KIRKINTILLOCH, May 2, read 1st: May 7, read 2d, and committed for Monday next: May 10, pet. of James Merry, Esq., of Provinside, near

Glasgow, praying to be heard by counsel, against; read, and ordered to lie on the table; the order for the Committee to meet on Monday next, discharged, and Bill ref. to the Standing Orders Committee on Tuesday next: May 15, rep. from the Standing Orders Committee; the Committee to be proposed by the Lords' Committees appointed for proposing Committees on opposed Bills.—NORTH MIDLAND, May 2, read 1st, and ref. to the Standing Orders Committee: May 10, rep. specially from the Standing Orders Committee, and leave given to proceed with the Bill: May 13, pet. of Earl Fitzwilliam, praying to be heard by counsel against, read, and ordered to lie on the table; Bill read 2d, and committed, the Committee to be proposed by the Lords' Committees appointed for proposing Committees on opposed Bills.

RAILWAYS (IRELAND).—April 12, pets. in favour of the measure proposed by Government, of the grand jury of the county of Kerry, assembled at spring assizes, 1839; read, and ordered to lie on the table; and of freeholders and inhabitants of the county of Kerry; read and ordered to be received as the pet. of Thos. A. Stoughton (the high sheriff), who only has signed it: April 26, pet. for a grant of money, to be applied in the formation of a main line of railway in Ireland; of the grand jury of the county of Cork, assembled at spring assizes, 1839, read, and ordered to lie on the table: April 30, pet. for further inquiry into the subject, with a view of facilitating the construction of; of citizens of the city of Dublin; read, and ordered to lie on the table: May 13, pet. for a grant of money, to be applied in the formation of a main line of railway in Ireland; of proprietors and others interested in the welfare of the province of Connaught; read, and ordered to lie on the table.—SOUTH-EASTERN, May 27, read 2d, and committed for to-morrow.—WEST DURHAM, May 27, pet. of Francis Mewburn, of Darlington, in the county of Durham, solicitor, complaining that the Standing Orders had not been complied with, and praying to be heard by himself, his agents, and witnesses, in support of the allegations of his pet.; read, and referred to the Standing Orders Committee.—WISHAW AND COLTNESS, May 2, read 1st; May 7, read 2d, and committed for Monday next: May 10, pet. of trustees of the turnpike road leading from Glasgow to Redburn-bridge, by Cambernauld, praying to be heard by counsel against, read, and ordered to lie the table; the order for the Committee to meet on Monday next discharged, and Bill referred to the Standing Orders Committee on Tuesday next: May 15, rep. from the Standing Orders Committee, and Bills committed; the Committees to be proposed by the Lords' Committees appointed for the proposing Committees on opposed Bills.

INSTITUTION OF CIVIL ENGINEERS.

The Session of 1839 was commenced Jan. 8, the PRESIDENT in the Chair.

Use of Peat Fuel.—At the close of the last session, a discussion took place on the use of peat in the manufacture of iron, and it was stated that the late Mr. Wilkinson, of Gateshead, smelted iron with peat fuel, and that the tools made from that iron were of a superior quality: that this iron was more malleable than Swedish iron.

Mr. Mushet was not aware that the smelting of iron with peat fuel had been recently performed. He could not conceive that the mere working of iron from bar into horse-shoes could produce any sensible effect; were the whole process conducted by peat fuel, the quality might be affected. He did not believe that peat could be used in the puddling furnace; it

might, however, in the refining. It might be used in the smelting furnace, but with a diminished produce. For welding a hollow fire is necessary, and peat will not readily make a hollow fire; iron may be improved in point of hardness by the use of peat. He had analysed many kinds of peat, and never found one to contain less than 5 per cent. of earthy matter; many contain 20 per cent.; coal seldom contains more than 4 per cent. The common bog peat contains 25 per cent. of carbonate of iron.

Several present bore testimony to the improvement in the working of iron by the use of peat, and that better weldings were made by it in consequence of its freedom from sulphur. The absence of sulphur in peat was denied by Mr. Lowe, who had used it for making gas at Amiens, and the quantity of sulphuretted hydrogen produced in the purifiers was very great. The Newcastle coal varied much in its qualities; some is exceedingly bituminous, making abundance of gas, but abounding also in sulphur and pyrites. He never met with any coal which did not produce sulphuretted hydrogen—thus proving sulphur to be an element of coal. The Tanfield coal is peculiarly free from sulphur. Dr. Smith remarked on the great influence which the strata had on the quality and nature of the peat; that the Dartmoor peat differs from all other peat in that it burns with a red ash.

It was remarked that the smiths in Cornwall owe much to their long practice in the use of peat, just as the smiths of Pembrokeshire have learned to use anthracite. Both, however, would probably use pit coal, could it be easily procured.

Case Hardening.—The conversion of iron into steel was discussed, and it was stated that iron could be converted into steel by immersion in pure carbon, as in the Macintosh process, at the rate of 1-30th of an inch per hour. Mr. Roberts stated the success of case hardening depended on the gentleness of the heat. Great care must be taken not to overheat, and case hardening might take place to the depth of 3-8ths of an inch in four or five hours. It was stated to be cyanogen united with iron which produces case hardening, but carbon which produces steel. An instance was mentioned by Mr. Carpmael in which animal charcoal was used for case hardening the interior, and vegetable charcoal for softening the exterior. Allusion was made to the fact, that the most perfect chill is obtained by the employment of moulds red hot.

Peat and Charcoal.—Mr. Farey alluded to the charcoal, or peat coke, which Mr. Oldham employs at the Bank of England; this is in thin cakes, and denser than the heaviest wood. Mr. Bramah remarked on the great value of compressed peat, could it be procured at a marketable price, on account of its superiority as a fuel for making large weldings.

The preceding minutes having been read, Mr. Parkes stated that the greater part of the charcoal used in Paris is from peat. The peat charcoal is preferred to the very best wood charcoal. There are two modes of making this charcoal; in a Swedish furnace, which is an oven made of lumps of peat: the pieces to be carbonized are placed in the interior, ignited, and smothered up in the usual manner. The other mode consists in getting peat as dense as coal, by allowing the small atoms to come within the natural force of cohesion. The peat for this purpose is dredged up from the bottom of streams, and laid up to dry, and formed into small bricks, which, on drying, contract very much. Compression will not do. In Holland they dig the turf and put it into running water. The water cannot be driven out by pressure. He had seen peat compressed with a force equal to that for pressing bowls for calenderers, but it was not near so dense as that formed by the natural means just alluded to.

Mr. Pellatt remarked that the coking coal does not deprive it of the sulphur. Washing the coke will remove much that remains; but even then it cannot be used for welding glass—nothing but the purest beech wood will serve for this. Charcoal will not answer, as it requires a flame. By welding, he meant the operation of putting a handle on a vessel. The glass being of a proper temperature, a union is formed, provided no sulphur be present.

Mr. Lowe remarked, it had been practically found that beech charcoal is valuable because of the quantity of carbon it contains. There is more pure carbon in a given weight of beech wood than of any other kind. Oak is the next best.

Jan. 29, 1839.—BRYAN DONKIN, V.P., in the chair.

On Framing Lock Gates without Iron Work. By S. Ballard, A. Inst. C.E.—The ledges, or horizontal pieces, are held to the back and mitre-posts by dovetail tenons and wedges; thus avoiding the use of iron T pieces and screw pins, which occasion the wood in immediate contact with them to decay, while the parts not pierced with iron are perfectly sound. This method was adopted in some gates on the Herefordshire and Gloucestershire canal, and after some years' experience, is found completely successful. Tar and white lead are put into the mortices, and the wedge driven down upon it, so that every crevice is filled, and the joints rendered water-tight; the planks, also, are fastened on with oak pins instead of nails.

Some discussion took place on the general opinion, that when dissimilar substances are in contact, as when a gate of one kind of wood is fastened with pins of another wood, some action tending to loosen the pins prematurely takes place betwixt them.

On Tubing the Boilers of Locomotive-engines. By George Buck, M. Inst. C.E.—In this communication, the author has attempted to determine the diameter of the tubes of the boiler of a locomotive-engine, so that the effect in the generation of steam may be a maximum. The following are the conditions upon which the problem is solved:—That the evaporating effect of the hot air, in passing through the tubes, is in proportion to the extent of surface in contact with the hot air, and as the time of contact conjointly. The following are the results of the investigation:—The distance between the centres of two adjacent tubes should be equal to four times the interval between their internal surfaces—the diameter of each tube should be equal to three times the same interval—that the tubes should be as near each other as possible.

In illustration, Mr. Buck has drawn two sets of tubes of the locomotive boiler as generally employed, and one as they would be arranged according to the results of this investigation. On comparing the products of the aggregate periphery, and the aggregate area of the tubes, it appears that the boiler tubed according to the above theoretic proportion is from 23 to 26 per cent. superior to the others.

On the State of the Suspension Bridge at Montrose, after the Hurricane of the 11th of Oct., 1838, with Remarks on the Construction of that and other Suspension Bridges, in Reference to the Action of Violent Gales. By C. W. Pasley, Col. R. Engineers; Hon. M. Inst. C.E.—By the hurricane of the 11th of Oct., 1838, one-third part of the roadway of the bridge at Montrose, with a very small exception, was carried away. The suspension-

rods on the west side were either broken or very much bent, but the chains, four in number, and extending in two parallel lines of two tiers each, appeared perfect. The distance between the piers is about 410 feet; and the chains had been strengthened by additional bars, or plates, since the bridge was erected. The statements of Mr. Provis, and the author's own observations, led him to the opinion that the motions which a bridge experiences are not lateral, but longitudinal. The Hammersmith suspension bridge does not appear to be subject to those longitudinal motions even in a most violent gale, and Col. Pasley considers this is amply accounted for by the longitudinal trussing which is there adopted. The idea that these longitudinal motions, and the injuries to the roadways of suspension bridges, are owing to the violent action of the wind from below, is confirmed by what Col. Pasley witnessed in Nov. 1836, at the Chatham dock-yard. One side of the roof of a shed for ship-building was raised up and down repeatedly, till at last a large portion of it, about 40 by 50 feet, was floated up like a sheet of paper, and carried to a distance of 50 yards. Such being the violence of the wind, we may readily conceive that the continual extension and compression to which the suspending rods must be subject by the rise and fall of the roadway, will in time break or bend them. This rise and fall of the roadway is prevented in the Hammersmith bridge by four lines of strong trussing along the whole length of the roadway, firmly connected to the bearers below; no similar trussing exists in the Menai, the Montrose, or any other suspension bridges which Col. Pasley has seen, or in the Brighton pier. The damage done to the latter in Nov., 1836, is attributed, by Lieut.-Col. Reid, who witnessed it, to the action of the wind on the under surface of the roadway, and not to the lightning. The rise and fall of the platform of the Menai bridge is confidently stated to be three feet in ordinary gales, so that unless some similar trussing be employed, it may reasonably be expected that this bridge will be seriously injured in some hurricane. The peculiar construction of the suspension-rods in several pieces, with joints, is a source of security to this bridge which the others do not possess. The author conceives that no suspension bridge of 400 feet betwixt the piers can be considered secure without two, at least, inflexible lines of longitudinal trussing from pier to pier.

Feb. 5, 1839.—The PRESIDENT in the chair.

The following were ballotted for and elected :—Alfred Burgess and John Taylor, as members; Joseph Baxendale, J. M. Parsons, J. Bennett, as associates; and Charles Wood, M.P., as an honorary member.

Corrosion of Substances.—At the preceding meeting, Mr. Cottam had mentioned an instance of iron enclosed in lead for ninety years, being taken out with the fin and bloom unimpaired. Dr. Faraday inquired whether this was in London, as the quantity of sulphurous acid in our atmosphere from the coal we burn, occasioned corrosions which do not occur in other countries. This was especially remarked by foreigners. Some years ago considerable discussion took place on the more rapid decay of the stone in the front of Somerset House than of the same stone in other situations; it had not occurred to him to refer it to the acid in the atmosphere.

Mr. Sibley remarked, that Westmoreland slating, which is extremely durable in other places, will not last in London.

Mr. Cooper had often observed the large quantity of sal-ammoniac and muriate of ammonia always to be found in the atmosphere of London. This arose from the soot, the rain washing it out; as might be at once ascertained by collecting some water, during a shower of rain, on a clean glass—muriate of ammonia was always in excess.

Mr. Lowe inquired whether any one had observed in the spouts conveying water from the tops of houses, a pellicle as of a volatile oil, or oxidable matter, on the first water from the tops of all houses, after a dry season. This peculiar pellicle is irradiscent, and disappears after a few hours.

[To be continued.]

OBIT.—Died, Feb. 17, Robert Christie, Esq., actuary to the Universal Life Assurance Society, and for some years secretary to the Mechanics' Institution. Our esteem for this amiable and respected gentleman, whom we had the pleasure for several years of being acquainted with, induces us to find a niche in our crowded pages for the following just tribute to his memory, sent us by one of his friends.

Could modest worth, could moral virtues save
The form they dwelt in, from an early grave;
Could talents rare, of selfish motives void,
Less for his own, than others' good employed;
Could genius, aided by a taste refined
That woke to energy, a master mind;
Could judgment sound a lengthened life assure,
Or, its best blessing, peerless health secure;
Could vast benevolence of heart and soul,
The last dread summons in its course control;
This stone should not 'till yet far distant years,
Claim friendship's sigh, or fond affection's tears;
While it records, what thus with truth it can,
"Here lies, God's noblest work, an honest man."

Double Stars.—It is a curious fact that has often impressed on philosophers as showing one common cause for the motions of the planets about the sun, and about their own axis, that except the satellites of Herschel, they all move one way. The comets, however, seem to obey no law, as they are found moving almost all ways, and in all possible directions. Professor Madler, of the University of Berlin, struck with this, was led to inquire whether a similar uniformity in the motions of certain small fixed stars about larger, which have lately occupied so much of the attention of astronomers, might not exist. The result was, that out of 51 cases, 34 were in favour of it and 17 against it.

PRICES OF RAILWAY SHARES.

Those finished are marked (1); in progress (2); which have their Bills, but are not begun (3); others (4).

NAMES OF RAILWAYS.	No. of Shares.	Share.	Paid.	Prices sold at.			Dividend per Cent.
				High-est.	Low-est.	Latest Price.	
(2) Birmingham and Derby . . .	6,300	100	70	55	46½	55	
(2) Birmingham and Gloucester . . .	9,500	100	50	28½	20	28½	
(2) Birm., Brist., & Thames Junc. . .	7,500	20	18	...	...	9	
(2) Bristol and Exeter . . .	15,000	100	25	13	10½	13	
(2) Bolton and Preston . . .	7,000	50	15	10½	9	9	
(2) Cheltenham and Great Western . . .	7,500	100	30	9	8½	9	
(2)* Chester and Crewe . . .	5,000	50	25	24½	22½	22½	
(2)* Do., Birkenhead . . .	5,000	50	35	41½	40½	40½	
(2) Commercial, Blackwall . . .	24,000	25	11	10	7½	9½	
(2) Dublin and Drogheda . . .	6,000	100	10	8	8	8	
(2) Eastern Counties . . .	64,000	25	16	10½	7½	10	
(2)† Edinburgh and Glasgow (old)	18,000	50	10	6	6	6	
Ditto, ditto (new) . . .	5,000	...	5	...	...	4	
(2) Edinburgh, Leith, & Newhaven . . .	5,000	20	7	...	...	4	
(2)† Glasgow, Paisley, and Greenock . . .	16,000	25	8	8	7½	7½	
(2)† Glasgow, Paisley, and Ayrshire . . .	12,500	50	15	11	11	11	
(1)* Grand Junction . . .	10,400	100	100	201	196	196	12
(3) Great Leinster and Munster . . .	8,000	100	5	18s 6d	18s 6d	18s 6d	
(2)§ Great North of England . . .	10,000	100	35	20	20	20	
(2) Great Western . . .	25,000	100	65	74½	71½	73½	
(4) Harwich . . .	11,000	20	1	...	...	½	
(2)† Hull and Selby . . .	8,000	50	25	14½	14½	14½	7½
(2) Llanelli Railway & Dock Co. . .	2,000	100	70	...	...	70	10
(1)* Liverpool and Manchester . . .	7,968½	100	100	194	193	194	
* Ditto ½ shares . . .	546	25	25	46½	46½	46½	
* Ditto ¼ shares . . .	7,968	50	50	76½	76½	76½	
(1)* Leicester and Swannington . . .	1,500	50	50	73½	73½	73½	8
(2) London and Brighton . . .	36,000	50	17	8½	7½	8	
(1) Do. and Birmingham . . .	25,000	100	90	162½	158	161	
Do. ½ Shares . . .	25,000	25	5	27	25	27	
Do. Bonds, 5 per Cent. 1843 . . .	...	...	...	...	...	...
(1) Do. and Greenwich . . .	20,000	20	20	17½	16½	17½	3
Do. New Shares . . .	...	...	20	19½	19½	19½	
(2) Do. and Southampton . . .	20,000	50	50	45	43	45	
Do. do. New . . .	16,000	25	20	...	...	...
(1) Do. and Croydon, Trunk . . .	20,000	20	16½	13½	13½	13½	
Do. New Scrip . . .	6,666	20	10½	...	...	8½	
(1)† Leeds and Selby . . .	2,100	100	100	70	70	70	
(2) Manchester and Birmingham . . .	30,000	70	15	12	10½	10½	
(4) Do. and Do. Extension . . .	15,000	70	7	6	5½	5½	
(2)* Do. and Leeds . . .	13,000	100	50	64½	64½	64½	
† Do. New Shares . . .	10,000	50	5	10	8½	8½	
(2)§ Maryport and Carlisle . . .	4,000	50	27	7	7	7	
(2) Midland Counties . . .	10,000	100	60	43½	40½	40½	
(1)§ Newcastle and Carlisle . . .	6,000	100	100	102½	102	102½	4
† Ditto ½ shares . . .	...	25	25	25	25	25	
(2) Northern and Eastern . . .	12,000	100	18	5½	2½	5½	
(2) North Midland . . .	15,000	100	65	61½	59½	60½	
(1)* North Union . . .	3,200	100	100	63½	57½	57½	
Do. New Shares . . .	3,200	50	50	...	...	64½	
(2) Preston and Wyre . . .	2,600	50	44	...	...	42	
(4)† Sheffield and Manchester . . .	7,000	100	10	4	2½	4	
(2) South-Eastern and Dover . . .	28,000	50	12	1½	1½	1½	
Do. New Shares . . .	...	...	15	3½	3½	3½	
(1) St. Helen's, Runcorn Gap . . .	...	...	100	...	...	40½	
(1)§ Stockton and Darlington . . .	1,000	100	100	205	205	205	14
(2) Thames Haven . . .	9,000	50	5	...	...	...
(2)* York and North Midland . . .	6,700	50	30	18½	18½	18½	

* Those with a * are the Liverpool prices, which are to the 27th inclusive. † Scotch. ‡ Manchester. § Newcastle. || Bristol. The others are London prices to the 29th.

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STEAM NAVIGATION JOURNAL.

No. XLI.

JULY, 1839.

NEW SERIES.

The Turbine, or French and German Water Wheel. By
GEORGE RENNIE, Esq., F.R.S., &c., &c.

[In the course of some conversation we lately had with Mr. Rennie on this famed instrument, he informed us that he had seen one of them in France, whereupon we requested him to favour us with a description of it. This he has kindly done in the following paper, which we have no doubt will be read with great interest in this country. Our curiosity being excited by the care to conceal the invention, we did, between the time of speaking to Mr. Rennie and his sending us the article, consider the subject, and though we had never seen any account or description of the machine beyond the very vague one to the French Academy of Sciences, we hope if we have not Fourneyron's secret, we have something not much worse. We therefore set about preparing a somewhat elaborate paper on it and its application to steam-vessels and locomotives, but having received a much more complete article from Mr. Rennie than we had requested or expected, we willingly yield the precedence to his, which, we doubt not, will prove infinitely more acceptable to our readers.—ED R. M., &c.]

It is somewhat remarkable in the annals of invention, that a machine which has excited so much interest in France and Germany, should have escaped the notice of journalists and scientific men* in this country. A model of the turbine was brought over to this country a few years

* In our 23d number, and one or two others, we gave a brief notice of this machine, which subsequently was copied into most of the newspapers. In the first notice there is an error by the translator in the quantity of water expended. It should be 1·06 cubic feet per second.—ED.

since, but nothing has been effected towards putting the principle into operation.

Under these circumstances, a brief account of this curious machine may be interesting.

The turbine is neither more nor less than an improvement on the spiral-wheel of the East, and the horizontal wheels so often met with in the south of France, Spain, Portugal, and Italy. Plates, and descriptions of these wheels, may be seen in the works of Zonca, Bockler, Ramelli, Walter, and Belidor; with this difference, however, that the water acts principally by its impulse.

Monsieur Navier, in his notes on "Belidor's Architecture Hydraulique," gives the theory of the horizontal wheels which are employed at Toulouse and in the Pyrénées. In these examples the water acts by percussion only, and the result of the experiments of Messrs. Tardy and Piobert give about 0.34 of the power expended for the useful effect, while according to M. Poncelet's experiments in 1825, only $\frac{1}{3}$ of the power expended was rendered useful. M. Poncelet, whose researches in hydraulic science have been so valuable, gave, in 1826, a theory for the curves of an horizontal wheel, on the principle of reaction, namely, that the water should enter the wheel at the circumference and leave it at the interior, without velocity. In 1833, M. Burdin (engineer of mines), proposed to construct another kind of wheel, which he designated turbine, but in 1823, previously in the year, M. Fourneyron had directed his attention to this machine, which, with unwearied perseverance, he succeeded in perfecting in the year 1833.

The machine of M. Burdin receives the water at the top of a cylinder, or vertical drum, and rejects it at the lower end. The water then flows either nearer or further from the circumference, according to the forms of the curves on the surface of the cylinder, the height of which should be regulated to half the height of the entire fall; whereas in the turbines of Fourneyron, the thickness of the cylinder is only a few inches. The water issues out of the curves horizontally from the interior of the cylinder, and penetrates in every direction the counter curves of the exterior-wheel, and escapes horizontally through vertical openings in the exterior-wheel; or, to simplify the explanation, we have only to imagine a wheel with curved buckets laid horizontally, and the column of water issuing from the centre to the circumference, or, by reversing the system, cause the water to issue from the circumference towards

the centre. So far the principle. But the main difficulty lies in the construction, and this M. Fourneyron has acquired by long experience.

Two turbines, constructed by M. Fourneyron, were experimented upon by M. Morin (so well known for his valuable experiments on friction, &c., &c.), one at Moussay, in the Vosges, and the other at Müllback, in the department of the Lower Rhine. The former has a fall of 3 metres, or 9.84 feet, and the latter a fall of 7 or 8 metres, or from 23 to 26 feet. The effects were measured by the friction lever of M. Prony, which was applied to the vertical axles of the turbines, and although the velocity of the turbine varied from 140 to 180 revolutions per minute, the difference between the actual expenditure, disposable effect of the fall, exceeded it only by $\frac{1}{17}$. It results from the experiments of M. Morin, first, that the wheel of Moussay of 2 feet 9 inches diameter, and $4\frac{1}{2}$ inches in thickness, on a fall of 24 feet 6 inches, is equal to 45 horses, and, secondly, that from 180 to 190 tons per minute the useful effect is 69 per cent., and which is very little diminished when the wheel is drowned.

The results of M. Morin's experiments on the turbine of Müllback, were—

1st. That the wheel of the turbine having a diameter of $6\frac{1}{2}$ feet, and a thickness of 1 foot, and a fall of from $11\frac{1}{2}$ to 12 feet, transmits a useful effect of 91 horses.

2d. That at a velocity of from 50 to 60 turns per minute, with the sluice well opened, the useful effect is 78 per cent. of the power expended.

3d. That the velocity of the wheel may be varied very greatly without altering the effect more than from $\frac{1}{25}$ to $\frac{1}{50}$ of the maximum effect.

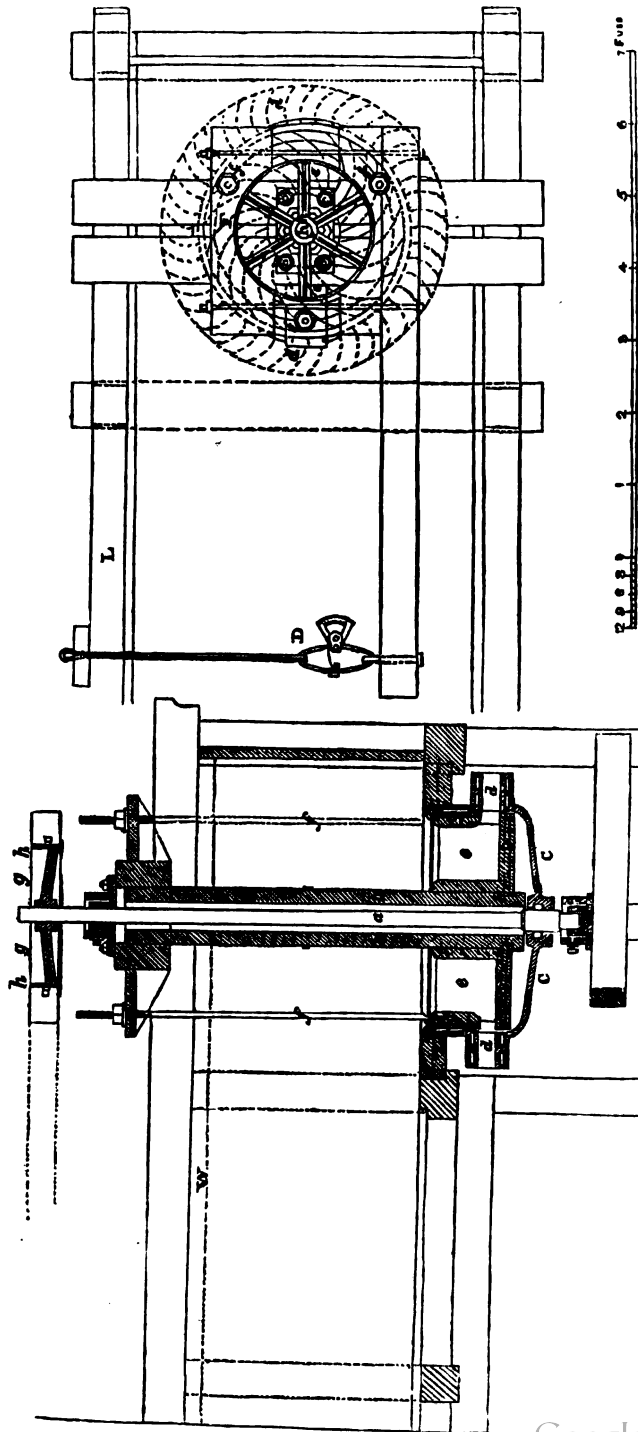
4th. That when the wheel is drowned it makes little difference from the effect when not drowned.

5th. That although the expenditure of the water may vary in quantity in the ratio of from 3 to 5, the useful effect is sensibly the same.

M. Morin has made experiments upon other turbines which have led to similar results. But the results obtained at the spinning-factory of M. d'Eichtal, at St. Blaise, in the Black Forest, are curious.

There the wheel of the turbine is only 21 inches in diameter, the fall 354 feet in height, the number of turns 2,300, and the power 40 (60?) horses.

When at Paris in October, 1838, I was recommended by



Messrs. Arago and Morin, to visit the turbine recently erected at St. Maure; circumstances prevented me from having the advantages of M. Morin's company, nevertheless the machine was very politely shown and explained to me. The following is a brief description:—

Diameter of the wheel of the turbine, 5 feet 8 inches.

Breadth of ditto, 10 inches.

Number of turns per minute, 55.

Height of fall, 11 feet.

Estimated power, 40 horses.

The axle as well as the other machinery, which was polished, had a crown-wheel fixed near the bearing of the upper part, sufficiently large in diameter to drive 10 pinions, connected with as many millstones, each 40 inches in diameter, and they were then erecting three similar mills on the same floor, so that there were concentrated 40 pairs of millstones, driven by 4 turbines, equal in power to 40 horses each, or 160 horses altogether.

The machines were constructed by an English mechanic, established in Paris. I was, however, informed that no one possessed the art of laying out the curves but M. Fourneyron,* and that the attempt to construct one of these machines without the superintendence of the inventor would be attended with disappointment.

Messrs. Wedding and Carliczect, of Berlin,† have investigated the curves with attention, and find them to be cycloidal. See the annexed plate.

DESCRIPTION OF THE PLATE OR ENGRAVING.

L, Lever. W, Water-level. F, Friction-wheel.

D, Dynamometer.

a, Main-axle of the machine.

bb, Pipe which encloses it.

cc, Disc of the turbine fixed on the main axle.

ee, Curves or discs let into the platform PP.

dd, Curves or discs fixed round the circumference of the turbine, on which the water issuing out of the curves of the platform PP impinges.

ff, Bolts and screws for raising or lowering the circular sluice *gg*.

Operation.—To set the machine in motion the sluice *gg* is drawn up by means of the screws and bolts *ff*.

* We should like to save M. Fourneyron the trouble of guarding this secret any longer.—ED. R.M., &c.

† Versiech mit horizontalen wosserradern, von Wedding et Carliczect.—Berlin, 1837.

The water, which is continually resting on the platform PP, the pressure of the whole fall immediately issues out between the curve discs, and impinging on the exterior curves of the turbine, causes it and the main axle, with all its machinery, to revolve rapidly.

In the annexed engraving, a friction-wheel and friction-break are attached to a lever, the vibration of which, and consequent power of the machine, is ascertained by the dynamometer.

The advantages of these machines are their simplicity and economy; they occupy very little room and can be placed in situations where a common vertical water-wheel could not. The facility with which their velocities can be increased or diminished render them well calculated for spinning, or for any mechanical operation which requires uniformity in changes of velocity *ad libitum*, and whereby increase or diminution of velocity may be obtained without the intervention of a train of wheels and their consequent friction and loss of power. To use the words of the commission appointed to examine the report of M. Morin, "The turbine is, of all the hydraulic machines in use, the most effective that has yet been compressed in the smallest form." *

GEORGE RENNIE.

A Few Observations on Raising Additional Capital and Loans. By the EDITOR.

[Continued from page 293.]

A THIRD plan of raising additional capital is that of creating a given number of new whole or fractional shares, then calling up a small portion only of the same, borrowing the remainder at interest, on the security of the future calls, and allowing a dividend upon the full share. This is the plan pursued by the Birmingham Company with their quarter shares. To enable our readers to judge correctly of this scheme, we shall give an outline of the facts. The original capital was 25,000 shares of 100*l.* each; and under the powers of their last Act, they created 25,000 quarter shares of 25*l.* each, besides taking up loans. Of the original shares, they have only called up 90*l.* each, and borrowed at interest the remaining 10*l.*; and of the quarter

* *Expériences sur les Roues Hydrauliques* a are vertical appelée turbine, par Arthur Morin, Capitaine d'Artillerie, &c., &c., Metz.

shares, they have called up only 5% each, and borrowed at interest the other 20%. Had 22*l.* 10*s.* ($= \pounds \frac{90}{4}$) been

called up on the quarter shares, each class of shares would have been on an equal footing; but by borrowing at interest the difference (22*l.* 10*s.* — 5*l.* =) 17*l.* 10*s.*, the Company have been giving a dividend on 22*l.* 10*s.*, instead of on 5*l.* Why this scheme of finance has been adopted we cannot understand, in a company the large premium of whose shares would have smoothed down any difficulty in obtaining the calls. It certainly will work, as all such schemes do, against the original shares, if persisted in when the interest and dividends come to be paid out of the earnings. The literal meaning of it is, to saddle the whole concern with the interest of 4-5ths of what a certain class of shareholders ought to pay, and to give this class near 5 times the dividend they ought to receive. As a finance plan for getting in money, it must be admitted it is better both for new and old shares than either the Greenwich or the Southampton, when the concern pays above 5 per cent., but otherwise it is worse. Suppose, for example, the company want the whole 125*l.*, and that 100% on the old, and only 5% on the new have been paid, the other 20% having been borrowed at an interest of 5% per cent.; and suppose, without loans, the concern would pay 8% per cent. Then, out of $8 + 2 = 10\%$, the interest, 1*l.* of 20% must be taken, and the

old share will receive $9 \times \frac{4}{5} = \pounds 7\frac{1}{5}$, and the new,

$\frac{9}{5} = \pounds 1\frac{4}{5}$. But had this been on the plan of making the

quarter shares have the privilege of half, the dividend on the old shares would have been $10 \times \frac{2}{3} = \pounds 6\frac{2}{3}$, and on the

new, $\pounds 3\frac{1}{3}$. The Birmingham old shares, therefore, are better on this plan in the proportion of $7\frac{1}{5}$ to $6\frac{2}{3}$, and the new, on equal sums paid, in the proportion of $1\frac{4}{5} \times 5$, to $3\frac{1}{3}$, or of 9 to $3\frac{1}{3}$, when the concern is paying 8 per cent.

Suppose, however, it will pay only 3 per cent. In the former or Birmingham case, the dividend would be

$(3\frac{1}{3} - 1) = 2\frac{1}{3} \times \frac{4}{5} = 2\frac{1}{5}$ on the old shares,

and $2\frac{1}{4} \times \frac{1}{5} = \frac{11}{20}$ on the quarter shares; in the latter,

it would be $3\frac{1}{4} \times \frac{2}{3} = 2\frac{1}{2}$ on the old shares, and $1\frac{1}{4}$ on the

new. That is, the old shares on the Birmingham plan would be worse in the proportion of $2\frac{1}{4}$ to $2\frac{1}{2}$; and the new, on equal sums paid, better in the ratio of

$(\frac{11}{20} \times 5 =) 2\frac{1}{4}$ to $1\frac{1}{4}$. Or, a Birmingham whole share

would be worth $100 \times \frac{2\frac{1}{4}}{5} = £44.$, and a quarter share on

which 5*l.* had been paid $5 \times \frac{11}{20} \div \frac{5}{20} = £11.$; so that the

two which cost 105*l.* would be worth 55*l.* In the latter, or Southampton plan, the old shares would be worth

$£100. \times \frac{2\frac{1}{2}}{5} = £50.$, and the new, $£25. \times 1\frac{1}{4} \div \frac{5}{4} = £25.$;

that is, 125*l.* paid would be worth 75*l.*, which is considerably better than the Birmingham plan, giving for 105*l.* only 55*l.*

We may hence conclude, that the Birmingham plan of raising additional capital is better for the shareholders when the line pays above 5 per cent., and worse when it does not, than the Southampton plan.

LOANS.—Being on the subject of capital, a few observations might not be unacceptable on the now prevalent method of borrowing on debentures. It is a method that should be proceeded on with great caution. Unless the cost of the line can be accurately ascertained, and it is sure to pay a clear dividend from the beginning exceeding the rate of interest, the loans at a fixed interest will diminish, and *may* swallow up the whole of the profits, and entail besides a growing debt upon the concern. A case of this kind, it may be supposed, can never happen, because the powers of companies to borrow are usually limited to one-third of the total capital. One part of it, however, has happened in the Birmingham Railway, which has actually borrowed more than the paid-up shares; and if confidence is to be placed in the articles in our three last numbers, there is some danger of the interest of the debts very much

crippling the dividends, if it does not almost wholly absorb them, at least for some time.

When the dividends exceed the rate of interest on the whole capital and loans, the borrowing is clearly beneficial. For it permits a greater dividend to be made on the capital; and if a sinking fund is likewise formed with a portion of the surplus, the debts may in time be paid off, while capital cannot, and the result would then be a great accession of income to the shareholders. For example, suppose the capital to be two millions, and another be allowed to be borrowed at 5 per cent. interest. If the concern would pay 7 per cent. on the 3 millions, the shareholders may pay the interest, and divide besides 8 per cent. indefinitely; or, by putting the surplus 2 per cent. as a sinking fund, they may in a few years pay off the million borrowed, and afterwards divide near $10\frac{1}{2}$ instead of 7 per cent. In all such cases, therefore, the borrowing system would be highly advantageous.

One popular argument for taking up loans is, the ease it gives to the shareholders. But do they not pay dearly for this in the interest? Would it not be better for them to advance the money themselves, and be allowed a somewhat less rate of interest in the way we have suggested in our last number? Suppose, for instance, that they begin to borrow $2\frac{1}{2}$ years before completing the line, they will have to pay up the interest, and when the line comes into operation, have to clear off the debt, and from 5 to 7 per cent. more of interest accumulated during the progress of the works, which operates like a premium paid for lending the money. If, therefore, they have ease, it is an ease for which they must pay, and the day of reckoning will come after all.

A disposition has lately been manifested in the Legislature to prevent the reckless borrowing of money in railway companies, by compelling them to call up the capital on shares first. There can be no doubt the original intention of Parliament was to enable companies to meet any unforeseen contingency, by giving them the power to raise a certain sum after all the shares had been paid up. The object of granting them the permission to borrow when one-half the capital had been paid, was, because then it was supposed they would know what the deficiency of estimate would be, and would have ample time then to borrow what they might want, that the works might not be interrupted. It was

never supposed they would suspend their calls and use the whole amount they might take up in lieu of them, not wanting, perhaps, a half or any portion of it.

Though we deprecate unlimited loans, as of very dangerous tendency, we think inconsiderate restrictions on companies may work much mischief, both to these great undertakings and to the proprietary individually, and of course, in the end, to the public. A great portion of the largest subscribers to railways consists of gentlemen extensively engaged in the mercantile interests of the country. They are, therefore, a portion of the most useful and valuable subjects Her Majesty has, and hence, should not be rashly injured. In times of mercantile difficulty, these are men on whom the pressure falls. If in such times companies could have no assistance from loans, so as to ease a little their proprietary, the end of it must be, either a sale of the shares at any price that could be got for them, or such a suspension of the works as might render it impossible to complete them within the time usually allowed by their Acts of Parliament, in which case, the whole of the property would fall into the hands of the proprietors of land on each side of the line. Can our legislators lose sight of so disastrous a contingency, which is not hypothetical, but one that may happen? Would they, by a hasty law, deal out such a measure of injustice to the best part of the community?—to men, we admit, who are seeking their own private interests, but with whose efforts and success the public weal is so largely—we may say inseparably—connected?

We repeat, we are no friends to heedless borrowing, which we think, may be very detrimental to companies. Indeed, we consider it ought, by every reasonable means, to be prevented. But the question is, how and in what way it should be done? Probably, if when one-half the capital is paid up the calls and loans go on *pari passu*, or in the due proportion of the remaining capital to the total amount to be raised by loan, it would prevent the possibility of improper borrowing, and would, as much as they could reasonably expect, ease the proprietors. This appears to us to be the simplest and most rational method of serving the subscribers, and securing the companies against any deeds of mismanagement.

An Account of Nautical and Hydraulic Experiments.
By the late COLONEL BEAUFOY; alluded to in R. M.,
page 302. By Mr. J. THOS. HACKET.

[Extracted from a large quarto work, published by Henry Beaufoy, Esq., at his own expense, for honorary distribution only.]

As most of your readers may wish to know something about the extensive and valuable experiments instituted by the Society for the Improvement of Naval Architecture, on which I have founded the foregoing observations, I trust a short account of the apparatus, process, and results, will not be out of place here, especially as they refer equally to railways and steam-navigation. This society was founded at a meeting held at the Crown and Anchor Tavern, Strand, 14th April, 1791:—president, the Duke of Clarence; vice-president, Earl Stanhope; secretary, Colonel Beaufoy; under-secretary, Mr. James Scott;—for the purpose of improving naval architecture in all its branches, and particularly the theory of floating bodies and the resistance of fluids. To conduct the experiments, a committee of gentlemen was chosen, all of whom entertained the most ardent desire to make themselves useful, yet, from their professional and other concerns, they were only able to afford occasional assistance, consequently, the principal labour of conducting the process and regular attendance from first to last, was borne by Colonel Beaufoy, who did not absent himself a single day; Mr. J. Scott and Captain John Leard, as often as the nautical duties of the latter would permit him to attend, did. In the year 1793, the experiments were commenced, and continued until near the end of 1798, one set having been made near the surface of the water, and the other at the mean depth of six feet under the surface. The upper end of the Greenland Dock was fixed upon as the largest and most convenient piece of still water for the purpose near London; it admitted a run of 400 feet, and had 11 feet depth of water.

The apparatus for ascertaining the resistance of the water to the bodies, consisted of a triangular stand fixed on the quay of the dock, the legs of which were about 60 feet in length, and 18 inches square, connected at the top with a 3-inch bolt, from which were hung four eye-bolts at equal distances; through the lower end of these passed a 3-inch bolt horizontally, to which was appended six blocks, that corresponded to five similar blocks fastened to another bar lower down, upon which chains were fixed to suspend the box containing the weights necessary to draw the experimental body through the water. The eleven blocks mentioned had each a brass shiver of 13 inches diameter, with a steel pin fastened in the middle of the shiver, so that both the shiver and pin revolve together, by which means the shiver was prevented from ever touching the cheeks of the block; the ends of

the pins were fitted with spherical containers, and the centres of all the blocks worked on Mr. Garnett's patent friction rollers.

A four strand rope of an inch diameter, made of the best hemp, was reeved through the blocks in such a manner that the standing and running parts go first through the middle blocks, by which means the box of weights were always kept horizontal. The running part of the rope which comes from the above-mentioned blocks, passed under a vertical wheel of 14 feet circumference, the frame of which was fastened to the ground, and also to the front leg of the strand, and from thence the rope passed horizontally to the floating body on trial. The standing part of the rope passed round the barrel of a crab, by which a horse wound up the box of weights previous to making an experiment. The tension of the rope, independent of friction, was calculated to be always equal to one-tenth of the weight of the box, bolts, lower blocks, chains, &c., for the power is to the weights as units to twice the number of blocks. To determine the friction of the ropes, pullies, &c., weights were gradually added to the running part of the rope, till it became just sufficient to make the box of weights ascend gently. This done, the counterpoise, which was fastened to the running end of the rope, was gradually diminished, until the box began to descend gently. Then half of the difference of these two weights, namely, of that which was a little more, and of that which was a little less, than sufficient to counterbalance the box of weights, was considered as the obstruction occasioned by the friction of the blocks, rope, &c.

In order to measure the velocity of the body on trial, a groove was made on the axis of the wheel, under which the running part of the rope passed, to receive a thin silken line, leading from thence round two small brass pullies to a cylinder placed horizontally, which partook, by means of that line, of the motion of the axis of the wheel upon the surface of the cylinder. A spiral groove was turned in order to receive another small silken line that was fastened to a thin fir batten, sliding in a groove in the scale made on the edge of a long deal board, placed horizontally, and parallel to the said wheel, on which edge the scale was graduated by actual admeasurement, so that the sliding batten moved a certain distance on it for every foot run through the water by the body on trial. To keep the silken line which drew the batten always of an equal tension; at the end of the groove in which the batten slid, a double cylinder, bearing a proportion to each other one to seven, round each of these cylinders a silken line was wound, the end of that on the larger was fastened to the hind-part of the batten, and to that on the smaller cylinder, a 4 lbs. retarding weight was hung, to prevent irregularity in the movement of the batten. The scale was graduated by the following method:—A piece of fine wire was wound round the periphery of the large wheel once, and another fourteen times in

the helix of the cylinder; the first wire was found to measure 13 feet 10·7 inches; the second, to measure 19 feet 11·9 inches; consequently, one revolution was 1 foot 5·1357 inches; then by the annexed proportion will be found the space on the scale answering to 14 feet.

As 13 feet 10·7 in. : 1 ft. 5·1357 in. :: 14 : 1 ft. 5·269 in., the space on the scale to be divided into 14 equal parts. With a pair of beam compasses, a certain number of divisions equal to that were then set off along the scale; these divisions were again divided into 14 equal parts, and each 14th into 10, and the parts of this last division were still large enough to be divided by the eye into 10ths. Thus each foot may be said to contain 100 divisions; consequently, when the moving body was drawn with a velocity of 10 feet per second, this small portion of time was accurately divided into 1,000 equal parts. The silken twist intended to draw the batten, was wound 14 times in the helix of the cylinder, and being measured, gave 14 feet 11·33 inches; whereas the wire gave 19 feet 11·9 inches; consequently, to correct the error arising from the difference of size between the silk and wire, the feet and decimal parts of a foot read off the scale, must be multiplied by 239·9, and divided by 239·33. In the course of the experiments, four different sized lines were used, and allowances calculated in each case for the difference between them and the wire as read on the scale.

Near the end of the scale a machine was placed, worked by a pendulum, and so contrived by a spring as to cause a pencil to leave a mark on the sliding batten as it passed, at the end of any number of seconds, according as the machine was set; thus accurately recording the distance run in a given time by the body on trial, as shown by the distances of the pencil-marks from each other on the batten. Previous to making experiments, the clock was regulated by an accurate astronomical time-piece, keeping mean time; and to prevent any accidental alteration in the pendulum, the bob and rod were screwed firmly together. By a simple contrivance, the pendulum was drawn as much from the perpendicular as was equal to half its arch of vibration, and then suddenly let go on the body's commencing its motion. It was observed that the body in the beginning of its motion moved at a much slower rate than the velocity it acquired afterwards, and which continued nearly for the remainder of its course. To enable the body on trial to acquire that uniform velocity much sooner, a chain 12½ feet in length was suspended at one end from the weight-box, to act as an accelerator, and by gradually losing its weight as the box descended and the chain touched the ground, answered the purpose extremely well. All the bodies used in the experiments were planed smooth and painted white. In the early experiments made in the years 1793 and 1794, the bodies used were of oak, some being 43 feet in length, and having a sectional area of more than

4 feet; consequently, from their dimensions, they were both cumbersome and heavy. Great trouble was found in making them come straight, and in adjusting the ballast with which they were loaded. This often caused them to deviate to the right or left of the line they were intended to follow. To obviate this error, the rope and sometimes the ballast was shifted; frequently both these corrections were obliged to be used, which caused much annoyance and loss of time in making experiments that could not, from these circumstances, be relied upon. It was not uncommon for some of the obtuse bodies, by collecting a quantity of water on the fore-part, to dive down to the bottom of the dock, then overset and throw out the ballast. In addition to this inconvenience, it became necessary to recover the lost ballast, which undertaking alone consumed a great deal of time. The bodies, in the year 1795, being of smaller dimensions, were more manageable, gave comparatively little trouble, and of course more accurate results. But in order to avoid the preceding difficulties, it was resolved, in the latter part of that year, in future to immerse the bodies 6 feet below the surface of the water, by means of iron rods projecting perpendicularly from the bottom of a conducting-vessel 25 feet in length, 1 foot square sectional area, floating with its upper surface 1 inch above the water, having oblique head and stern ends, sloping from the bottom at an angle of less than 9° to the upper surface of the vessel, the slant measuring 6 feet in length. In the commencement of these experiments, the bodies were still found to be too heavy and unwieldy, therefore could not be easily taken out of the water when necessary to examine if they were truly parallel with the conducting body. These bodies, also, were liable at times, as in the experiments at the surface, to deviate from their course, particularly from want of parallelism to the conducting body. It was resolved to reduce the size of these experimental bodies in the following year. The principal piece being a parallelopipedon of 10 feet in length, and a sectional area of 1 foot square. The effect of adding various wedge-shaped head and stern ends to this body were tried, in order to ascertain how they conducted towards reducing the resistance. In making this improvement, the $1\frac{1}{2}$ inch bars attached to the conductor were altered to within a distance of 6 feet of each other; the contraction of space had so great an effect, that not a single satisfactory experiment was made during a period of four months. After examining the apparatus many and many times, and the bottom of the dock, to find out obstacles that could impede the velocity of the moving body, it was at length discovered that the proximity of the bars to each other caused the hindmost bar to be affected by the eddy of the foremost. The bars were accordingly altered from a circular form to an elliptical one; the longer diameter being $2\frac{1}{4}$ inches, and the shorter $1\frac{1}{8}$ inch, and placed 9 feet 8 inches apart. These united circumstances completely obviated the

cause of so much perplexity. Further improvements were made on the conducting body. In the year 1798, an upper surface was attached to it, 3 feet wide and 3 inches in thickness, extending along the whole length of the body, slanting at each end, and of course projecting one foot over each side of the former body, making the transverse section like a T. The bar used for immersing the small bodies was also improved upon the section, being that of a long ellipse, 8 by 2 inches, which acted as a rudder, and when properly adjusted, caused the conducting vessel to make a direct course. These improvements made in the conducting apparatus, and in the size of the experimental bodies, rendered those experiments made in 1797 and 1798, more correct than any of the preceding ones; and of course upon them I have founded my calculations respecting atmospheric resistance. It was found that the immersed bodies experienced less total resistance in moving than those at the surface, but this difference was discovered to proceed from the vacuity at the stern end being more readily filled up underneath the water, the top surface of the body not permitting it to run in so quickly when above the water.

The total resistance of the bodies was divided into plus pressure, minus pressure, and friction. Plus pressure is the amount of additional pressure sustained by the head end of a body from a state of rest to that arising from the displacement of the fluid, in order to permit the moving body to pass through it. Minus pressure is the subtraction of pressure from the stern pressure, caused by the fluid not pressing so strongly against the stern end or hindmost part of a body in motion, as when at rest. Friction is that sort of resistance which arises either from the adhesion of the particles of the fluid to the surface of the moving body, or from the roughness of the body, or from both causes united. Total resistance is the sum total of the plus pressure, the minus pressure, and friction united. Head resistance is the plus pressure and friction of the water against the head end united. By stern resistance is meant the minus pressure and the friction of the water against the stern end added together. It was computed that the total resistance of the cube moving at a velocity of 13.527 feet per second, amounted to 213.88 lbs. This body was observed to oscillate and roll when propelled with a motive weight of 24 lbs., which increased in the succeeding experiments with weights of 36, 48, 72, and 96 lbs. The cube rolled so much with the latter weight as to cause that experiment to be rejected, in contrast to which, the cylindrical body of the same sectional area and length was perfectly steady when impelled with a motive weight of 120 lbs. The addition of a semi-cylinder to the after-part or stern end of the cube, reduced the total resistance to 174.50 lbs., and by placing it on the fore-part or head end of the cube to 62.04 lbs., with a semi-cylinder on each end of it, reduced the total resistance to 59.71 lbs. A cylinder of the same sectional area and

length as the cube, was resisted at the above velocity with a force equal to 194·0 lbs.; adding an hemispherical end to the after-part of it, the force was equal to 167 lbs. When applied to the fore-part of that body, the force was equal to 52·59 lbs. One on each end of it reduced the total resistance of the fluid, moving at the above velocity, from 194 lbs. to 48·42 lbs. A globe having the same diameter as the cylinder (13·54 inches), was resisted by the fluid at the above velocity, with a force equal to 62·85 lbs., which exceeds the resistance of the cylinder with hemispherical ends by 14·43 lbs. This was a curious circumstance, namely, that, dividing a globe in halves, and placing them one at each end of a cylinder of the same diameter, and as much in length, should reduce the total resistance of the globe more than 1·5th.

By adding triangular head and stern ends of 3 feet in length to the cube, the total resistance at the above velocity was reduced from 213 lbs. to 41·10 lbs.; by making the triangular sides of the front or head end slightly segmental, the total resistance was reduced to 40·22 lbs. The resistance of the parallelopipedon 10 feet in length, having a cross section equal to the cube, at a velocity of 13·527 feet per second, was equal to a force of 199·37 lbs.; by adding triangular ends 3 feet in length to each end of it, the total resistance was thereby reduced to 65·46 lbs.; the resistance from friction alone on this body amounted to 26·42 lbs. In comparing the resistances of the cube and parallelopipedon, the former exceeds that of the latter, which is evidently caused from its rolling and unsteady motion. Were it not for this cause, the cube would have less resistance than the parallelopipedon, by the difference of friction between them, 20·60 lbs., instead of being greater, which appears evident by comparing the total resistance of these bodies when triangular ends are added to them. The resistance of the cube in that case is 41·10 lbs., whilst that of the parallelopipedon is 65·46 lbs. Here the difference, 24·36 lbs., is in favour of the cube, because its rolling motion is corrected by the triangular ends. But as that sum exceeds the difference of resistance arising from friction, between the cube and parallelopipedon, by 3·76 lbs., the latter advantage in favour of the cube no doubt proceeds from the proportion the length of the triangular ends have, compared to the length of these bodies, being as three times the length of the cube, and but three-tenths the length of the parallelopipedon. Experiments were made with a wide and long plank, and one-half its length, and having sections of the same dimensions and area. To determine the amount due to friction, one set of experiments was made on planks that were planed smooth, painted, and well water-soaken; another set, on planks that were planed smooth and painted, but not water-soaken. The former proved the resistance from friction to be, on 50 square feet of surface, water-soaken (but clean from slime or dirt), moving at a velocity of 8 miles per hour, to be 25·04 lbs. = to 0·50008 lbs.

per foot; the latter experiments proved the amount of resistance from friction on the surface of a plank planed smooth and painted, but not water-soaken, moving at a velocity of 8 miles per hour, on 46 square feet of surface, to be 19·856 lbs. = to 0·43106 lbs. per foot. They found, from the result of these experiments compared with others, that the resistance arising from friction, even against very smooth surfaces, is considerably more than it has generally been conceived to be, or than had hitherto been accounted for in calculations of the resistances to bodies moving at different velocities through water; and although ships may be built ever so much alike in their forms and dimensions, yet still a very little difference in the smoothness of their immersed surfaces, will produce a considerable difference in their comparative rate of sailing.

From a set of experiments on the following bodies, presenting each a surface of 144 square inches, moving at a velocity of 8 miles an hour, it seems the resistance to a round sheet-iron plane was equal to a force of 205·13 lbs.; to a square sheet-iron plane, 203·79 lbs.; to a cube, 202·30 lbs.; to a cylinder, 190·78 lbs.; to a globe, 64·87 lbs.; to a globe cut in halves, united to each other by the intervention of a cylinder a foot in length, 46·29 lbs. It appears that the cube and cylinder meet with less resistance than the square and round iron planes; and the globe divided by a cylinder, than the globe itself. These differences arise from the water which is deflected by the front of the planes acting with its whole deflected force to prevent the surrounding water from filling up the void behind. Whereas, in the cube and cylinder, the water which is deflected by the front of the said bodies, has time to lose a great part of its deflected force before it arrives at the stern end of the moving bodies, and therefore the surrounding water is not so much impeded by deflexion from filling up the void.

Any attempt of mine to describe, in so limited a space, the numerous experiments—amounting to more than 10,000—on those and other bodies, could but give an imperfect idea of the labour and attention bestowed in making, and afterwards comparing them with each other, and from thence reducing the results into a “regular series,” for different velocities up to 13·527 feet per second, and from 1 to 8 miles per hour. It is needful to mention that the requisite calculations for doing so were conducted for a period of 10 years subsequent to the final close of the experiments at Greenland Dock, by Colonel Beaufoy, assisted by Mrs. Beaufoy (who was a mathematician and astronomer), and after her death by Mr. J. Scott.

Although there was so much interest excited for promoting the objects of the Society at its first establishment, it was, however, allowed to sink for want of assistance and funds, and for a considerable period the latter and best experiments were conducted at the sole expense of the indefatigable secretary. Probably it would

be well worthy the attention of steam-navigation companies, if they were to try experiments with similar apparatus to that described, on suitable models of steam-ships, made by scale, of various approved proportions and forms; from which, one offering the least possible resistance may be discovered, which would well repay them for the expense and trouble. Whatever the additional amount of resistance experienced by steam-ships on the present forms may be, above those of least or less resistance, it should be estimated as producing a constant loss of speed, engine-power, fuel, and other considerations important to the success of steam-navigation.

I am, Sir, yours, &c., &c.,

March, 1839.

J. THOS. HACKET.

First Report from the Select Committee on Railways.

[Continued from page 308.]

LIVERPOOL AND MANCHESTER.—Capital.—We are really unable, from the evidence, to make out the actual amount of the capital and loans. It does not appear that the witnesses were at all prepared to answer the questions. We must, therefore, refer our readers to the document published in our last from the returns made to the House, containing the capitals and loans of all railways and the Acts under which they are raised. The first estimate was only 300,000*l.*, thought it very full at 510,000*l.*, and it has cost 1,200,000*l.*

Fares.—Originally the first-class fares were 7*s.*; they were afterwards lowered to 5*s.*; then, in consequence of the duty laid on, raised to 5*s.* 6*d.*, and another 6*d.* was put on when the tunnel was made. They are now 6*s.*, and 4*s.* 6*d.* for the whole distance, 32 miles. When the fares were lowered, the number of passengers increased, but the witnesses could not say whether that was owing to reduction of expense or greater confidence in the public. When the fares were raised from 5*s.* to 5*s.* 6*d.* do not think checked the travelling, because it was counterbalanced by other circumstances; but in witness's "opinion every 6*d.* put on diminishes the travelling." Are not limited as to charge for fares, only as to tolls. The fares must be reasonable.

By-Laws.—The company have but one for the public imposing penalties, namely, a prohibition from smoking. They have some affecting their own servants—would have no objection, before they become efficient, to have their by-laws considered by some competent authority.

Carrying.—Have no regulations like the Birmingham Company to limit their responsibility either in conveying horses or carriages. They are completely under the Common Carriers' Act. Any one may run engines on their line, but do not.

Tickets.—They collect them as the Grand Junction, after the

passengers are seated ; may be occasionally imposed on, but not to any great extent.

Fences.—A wall on an embankment would not be so good a fence as a mound ; but the witness gave no reason for it.

Length of Line and Weight of Rails.—32 miles ; rails originally 35lbs. per yard, now 60.

Royal Commission.—Mr. Laurence thought a Royal commission might protect the public against improper speculation ; thinks the frauds committed by engineers on the public in not including in their estimates engine-houses and stations might be prevented by a commission ; thinks its object should be to ascertain whether the line is wanted, and if so, whether it is the best ; thinks when the commission had decided, the public would subscribe as willingly as to one of its own choosing. This witness's ideas were excessively confused on the subject. The idea of a commission was new, it originated with Mr. Moss. To some questions put by Sir Robert Peel he answered, that he thought the commission would have been just as ignorant as the directors were, that the latter would be as competent now as a Royal commission ; that the duties of the commission should be to decide what line should be made, and whether a single way or two ; as to the powers a commission should have he hardly knows, but when it had decided between the merits of two competing lines, its powers should cease.

Mails.—The bags and guard, whatever weight they may be, are carried at 1½d. [We presume per mile.]

The witnesses were Charles Laurence and Henry Booth, Esqrs.

GREAT WESTERN.—*Capital* is given in our last. It is 2½ millions with power to borrow besides 833,333l. After raising on shares one-half the capital, they have power to take up, on the mortgage of the tolls, the other half. The shares are 100l. shares, they called up 65l. and took up on loan the remaining 35l. ; come now to Parliament for 1½ million to be raised in half-shares, and ½, or 416,666l. by loan, or 1½ million more, making in all 5 millions ; have power to capitalize all the loans.

Cause of Increased Expenditure.—One cause was the having a separate terminus at London, and 3 miles additional of line to make ; it was originally intended to have the same terminus as the Birmingham. The expense of stations has been greater, the public requiring greater accommodation from the increased numbers. First cost of locomotive power has been greater. The price of labour has been higher. More land has been required ; the average was estimated at 8 acres per mile, whereas it has been 12. Mr. Saunders attributes this partly to the increased earthwork to improve the gradients, by which the embankments have been higher and the cuttings deeper. The earthwork was assumed at 1s. 1d. per cubic yard, it has cost 1s. 7d.

New Shares.—These are to be offered to the proprietors, and it

is expected they will take them. There is a clause in the Act to prevent a preference, and all dividends are to be paid on the amounts duly paid up.

Royal Commission.—Do not see how a commission could have lessened the expense, unless by retarding the progress of the works; nor have formed any juster estimates than they did of the cost of the works. Thinks a commission, by fixing the gradients, plans of the bridges, &c., before going into Parliament would do irreparable mischief.

Gradients.—Except on the inclines the gradients nowhere exceed 7, and average 4 feet a-mile. It is possible that water-power may be employed to draw the trains up the inclines at Wotton Bassett and Box-hill instead of steam-power. [We presume on the principle of the French turbine or water-wheel.]

Carrying and Fares.—Their average fares are 2d. per passenger per mile. 1st class is 3½d.; 2d close, 2d.; 2d open, 1½d. per passenger per mile: number of passengers is 4 of second to 1 of first class—the close is 3 to 4 of first, the open 3 to 1. They are under the common law of the land as ordinary carriers. They refuse to take horses unless the owner signs a contract to be at his own risk, yet they think they would be liable for any neglect of their own servants. They think they might refuse to take gentlemen's carriages or servants, by breaking up the horse-boxes and trucks. (?) Other parties might run engines on their line, but they think it would be impossible to be done without great danger, and if attempts were made to do so to any extent, it would be necessary to apply for powers to abolish so dangerous a system.

By-Laws and Tickets.—Their by-laws with respect to horses, carriages, and tickets are the same as those of the Birmingham; but the tickets are taken from the persons before they enter the carriages, which are locked before they enter and just as they start. Every one seems to like this system of taking the tickets; and the locking is done for safety on the road as well as security against fraud. There are different carriages for persons going to different places; and if a person going the whole distance wish to get out at any station for his convenience he might. If a person "commit any offence against the Act," and refuse to give his name and residence, they may, by a special clause in the Act, detain and take him "with all convenient despatch" before a magistrate, and they may inflict any penalty not exceeding 5l. for every offence. In the present Act there is to be a proviso that no by-law shall be valid until approved by one of the Judges of Westminster Hall; and another proviso that to be binding, the said by-law shall not be repugnant to the common laws of Great Britain. Thinks it would be advisable to have one code of by-laws for all railroads in the kingdom.

Mails and Speed.—They do not, at present, carry but one bag

at 12 o'clock for Windsor, for which half-a-crown is paid each way. The speed exclusive, of stoppages, is 34 or 35 miles an hour, including, 30.

Gage.—Quite satisfied with their present width of rails, and think the experiment has perfectly succeeded. Do not lay much stress on a perfect uniformity of gage. Witnesses, Wm. U. Sims and Charles A. Saunders, Esquires.

SOUTHAMPTON RAILWAY.—*Capital.*—Original capital was one million, with power to borrow 330,000*l.* When 800,000*l.* had been called up, an Act was applied for to raise 400,000*l.* more in half-shares, and 130,000*l.* on loan, making 1,400,000*l.* capital and 460,000*l.* on loan. Of the 20,000 new shares, 17,000 were taken by old proprietors, at once the others declined, and the remaining 3,000 were taken then by those who had taken the 17,000. Have had only about a dozen shares to forfeit.

Estimates.—Should be sorry to say the low estimates of the railway had been made unfairly, but the facts have not verified the prediction of the sufficiency of the estimates. "The Southampton Railway always had the reputation of being under estimated." The cuttings were estimated at 6*d.*, but have cost much more, 1*s.* By one deviation at St. George's-hill they knocked off 3 millions from a cutting which was to be "3 millions some odd thousands." The original estimate of earthwork was 16 millions cubic yards, which has been reduced to 11 millions, and the gradients are improved. There is more earthwork on these 77 miles than on the Birmingham of 112, but the material is better. Giles's estimate for the stations was not $\frac{1}{2}$ of the cost. The original engineer was Francis Giles, the present is Joseph Locke. The land was estimated at 90,000*l.*; it has cost 260,000*l.*

By-Laws and Tickets.—They are the same as those of the Birmingham, but less stringent. They take the tickets at the last stage but one, and expect the parties to pay again if they cannot produce them. In making the by-laws they have a proviso that they shall not be contrary to the general laws of the country. All their by-laws are subject to an appeal from, but they have acted so cautiously as to require no coercive measures. Thinks for the safety of the luggage and convenience of passengers, regulations are needful for keeping parties out of the stations.

Royal Commission.—If a commission or board had been appointed to fix the price of land and compensation it would have been beneficial. They have paid a great deal too much. Does not think a board to assist the committees of the Commons would do any good. In practice the judgment of military engineers has usually not been found to be worthy of dependence. Has been before committees of both Houses, and thinks them as competent tribunals as any that can be got. He sees no use in a Royal commission.

Carrying.—Have no regulations as to carrying gentlemen's

horses and carriages; no necessity for signing any paper by the owners taking on themselves the security. They carry but have had no accidents. The fares taken from the passengers are not near the maxima. They have a maximum toll, but no limit as to the amount they may charge as carriers. Fare for first-class passengers, a fraction under 3*d.* per person per mile; for second, a fraction under 2*d.* They have lowered the fares near London in hopes of a greater revenue, but owing to the season of the year, the winter, cannot say what the effect will be. Are not likely to raise the fares; for he believes in a distance of 38 miles the difference in expense to them would not be 5*s.*, whether they carry 50 or 100 passengers in one train, and their object, therefore, is to induce as many as they can to go by reasonable fares. Others have nominally the power of running trains on their line, but practically they cannot do it. They carry but little goods now, but when they begin there will be no preference to any one.

Mails.—They take the mails but at a very small sum merely to gain experience; they take the three mails up and down three times a-day for 6*l.*, and at times of the day when they get no passengers. When the line to Southampton is completed they will take the mails the whole distance, 76 miles (76½), in 3½ hours.

Morecambe Bay Embankments. By INVESTIGATOR.

TO THE EDITOR OF THE RAILWAY MAGAZINE.

SIR,—Taking a considerable interest in the promotion, wherever practicable, of that valuable system of communication by railways for travelling, which I have good reason to believe owes its origin to the late Mr. James, who projected the Manchester and Liverpool Railway, and subsequently introduced Mr. Stephenson there, to which he owes his present advancement, I am very desirous that every plan for a railway, by whomsoever suggested, should be thoroughly investigated, in order that the public, as hitherto, may not be so grossly deceived and imposed upon by deficient estimates, which I am sorry to say have been carried to such an extent that no faith whatever is placed in engineers, however respectable; and when we consider that the original estimates for the Manchester and Liverpool, the Birmingham, the Stockton and Darlington, and other railways have been doubled, and in some instances trebled, I think it is high time, for the honour of the profession, that a thorough reformation should take place; and, for my part, I cannot conceive why correct estimates should not be made now, as they were formerly, when we have the examples of the Breakwater at

Plymouth, Waterloo-bridge, and other works, which were executed according to the original estimates. Without further preface, therefore, I wish to make a few remarks upon the proposed plan, which has been so much vaunted in the north, of carrying a railway of 12 miles across Morecambe and the Dudden sands, by an embankment. This work has been estimated by Mr. Hague at the sum of 434,131*l.*, and proposed to be completed in 3½ years; and I should like to know very much by what means this conclusion is arrived at, for if I am correctly informed, the tide rises at this place 26 feet, and sometimes 30 feet; and allowing the average height of the embankment to be made at 24 feet 9 inches, as stated in the reported speech of Sir Fleming Senhouse, there would be a perpendicular rise of 14 feet 9 inches against the outer slope of the embankment, at ordinary spring tides, and 18 feet 3 inches at 30 feet tide. And as it is stated that the height of the embankments to be made would vary from 41 to 16 feet, the whole range of the tide would be upon the slopes in some places, and in others, allowing the top of the embankment to be 6 feet above a 30 feet tide, which does not appear sufficient, a section of water of 35 feet in depth, would have to be sustained.

Now, admitting the embankment to be composed of earth in the first place, the outer slopes cannot be taken at less than 7 to 1 to resist such a head of sea, the inner slopes 2 to 1, and the top 30 feet wide, which will give a sectional area of 388 yards for every yard forward, which, considering that the great bulk would have to be done during tide, the work cannot be taken at less than 1*s.* 6*d.* per yard, which would make 29*l.* per yard, or 51,040*l.* per mile; and as it is quite clear that the surface of this embankment could not resist a sea unless paved with stone at 18 inches thick, it would require 30 cubic yards of stone for every yard forward, and as this would have to be carried upon an average two miles, including quarrying and putting it in its place, cannot be taken at less than 7*s.*, making an additional cost of 10*l.* per yard, or 17,600*l.* per mile; this added to the other, makes 68,640*l.* per mile. But as in making embankments of this kind, particularly in such a situation as that would be, exposed to the whole force of the Atlantic during gales which prevail from the west nine months out of twelve, an immense quantity would be carried away, even under the best management, every tide. The cost, therefore, cannot be taken at less than 137,280*l.* per mile, besides the railway

chairs, bridges, sluices, and other works which would be absolutely necessary to enable the various rivers which enter the Bay to discharge themselves into the sea. The bare cost of the embankment, therefore, without the other works, cannot be less than 1,647,360*l.*, and adding 200,000*l.* for the other works, would make a total of 1,847,360*l.*, instead of 434,131*l.*, as estimated by Mr. Hague—more than four times the amount!

I come now to the next important item, namely, time. I should be glad to be informed how Mr. Hague is to make two embankments, containing 8,194,560 cubic yards, which would be the bare content of the embankment when completed, including all his bridges and sluices, in the space of 3½ years. In fact, this appears to me impossible; and I think any one who knows anything about the subject, will say so upon consideration, and I am sure you will agree with me, that it is only wasting time to pursue it further. If the thing is to be done at all, and in any reasonable period of time, the best plan appears to be, to make a wooden bridge of it, which could not be done, at a moderate calculation, at less than 40*l.* per foot, or 211,200*l.* per mile; and for the 12 miles, 2,534,400*l.* But then, with the wooden bridge, what becomes of all the fine utopian prospect of gaining 52,000 acres of fine land? This would remain bare sand, as it now is, worth literally nothing! in fact, the more the subject is investigated, which I thoroughly trust it may be before any unfortunate shareholders embark in it, the more it will be found that the whole project, as now laid down, is utterly absurd and impracticable; and I am extremely sorry to find that this project has been backed by another engineer, Mr. Rastrick, who, I am sure, upon further consideration, will agree with me in everything above stated.

I am, Sir, your obedient servant,
INVESTIGATOR.

Mr. Coke's Question Practically Answered. By OCTAVIUS DUNSTAN, Esq., Superintendent of the Wadebridge and Bodmin Railway.

TO THE EDITOR OF THE RAILWAY MAGAZINE.

SIR,—In your Magazine for the present month, p. 241, you desire the opinion of any of your readers in reference to the inquiry of John Coke, Esq. I cheerfully submit the following statement, if you think it to the purpose.

A branch of the Bodmin and Wadebridge Railway rises 1 in 50 = $105\frac{1}{2}$ feet in a mile. On this road there are sharp curves, and the rise very nearly regular. On this, locomotive-engines are regularly worked, taking from 22 to 33 tons, according to the state of the weather. On one occasion one of the engines (the Elephant, made by the Heath Abbey Iron Company) took $36\frac{1}{2}$ tons, besides the weight of the engine and feeder = 15 tons. Eight wagons = 2 tons each, = 16 tons, i.e., load $36\frac{1}{2}$ tons + 15 tons + 16 = $67\frac{1}{2}$ tons. With this load the engine ascended at the rate of $5\frac{1}{2}$ miles per hour, which is the usual speed on that branch. Mr. Coke has not given the radius of the curves on the road to which he refers, and the word *sharp* being so much matter of opinion, I do not see how I can assist him further, except, I may say, that some curves on our road do not exceed a quarter of a mile radius, on which we work with coupled wheels. This, however, you will agree with me, is very objectionable, and it must depend on other circumstances how far an engine on such a road can be worked economically. The fact of the Mansfield road being in a coal district, is important in point of expenditure.

Having derived much information and satisfaction from the "Railway Magazine," which I have had from the commencement, and being desirous of contributing my mite, will be an additional reason for my making the above communication.

I am, yours respectfully,

OCTAVIUS DUNSTAN,

Superintendent of the Bodmin and Wadebridge Railway.
Railway Office, Wadebridge, Cornwall, May 27, 1839.

P.S. We have worked the railway between four and five years.

Zarsko-Selo Railway.

WE were favoured by a friend with the following accounts of the cost of construction and working expenses of this Russian railroad, too late for our last number.—ED.

General Account of the Zarsko-Selo Railroad Company, the 31st December, 1838.

CONSTRUCTION OF THE RAILWAY AND BUILDINGS.

DR.	Rubles.	Cop.	Rubles.	Cop.
Land and compensation	92,400	23		
Preparatory works	34,765	45		
Embankments	460,797			
Bridge over the Town Canal . .	125,412	28		

	Rubs.	Cop.	Rubs.	Cop.
Bridges, culverts, &c.	108,185	35		
Wood sleepers	90,022	81		
Drainage	19,799	68		
Ballasting	289,118	38		
Rails	684,446	62		
Chairs	141,154	54		
Blocking pieces, keys, pins, and nails	79,788	43		
Turntables and laying down . .	43,454	12		
Freight of iron and turntables .	64,885	27		
Laying down rails	77,275	13		
Switches	12,510	95		
Buildings in Paw- lowsk rubles 426,821	73			
In Zarsko-Selo	272,308	59		
On the Moscow-road	64,127	57		
On the Town Canal	28,270	57		
In St. Petersburg	76,946	37		
Building barracks	77,123	70		
Coke ovens & sheds	45,671	76		
	991,270	29		
Stock, &c.	698,201	63		
Fitting up and repairing Shop . .	20,375	28		
Mr. F. A. von Gerstner, engineer, for constructing railway	612,500			
Directors' expenses	79,874	65		
Contingencies	33,240	41		
Works in the Park of Pawlowsk .	99,915	96		
Furnishing the Restauration in Pawlowsk	59,538	64		
Ditto, ditto, in Zarsko-Selo . .	26,634	14		
Loss working the Railway until end of March, 1838	86,100	40	5,031,667	64
Balance of Cash, 1st Jan., 1839 .			5,822	56
Do. of the Chevalier F. A. von Gerstner's account			1,471	
Deposits in the hands of the au- thorities at Petersburg, for pro- perty purchased	189,700	84		
Ditto, ditto, in Pawlowsk	15,636	66	205,337	50
	Rubles	5,244,298	70	
CR. ACCOUNT OF THE SHAREHOLDERS.		Rubles.	Cop.	
By 17,500 shares paid up in full, at 200 rubles per share		3,500,000		

	Rubs.	Cop.	Rubs.	Cop.
Loan Account of the Government for 37 years rubles	1,500,000			
Interest for the first year	75,000			
			1,575,000	
Private Loan			40,000	
Unclaimed Accounts			980	
Sinking fund of loan from Government, repaid of capital of 1,500,000 rubles, at 1% first year .			15,000	
Unpaid dividends			43,746	62
Reserve capital			69,572	8
			<u>Rubles</u>	<u>5,244,298</u>
				<u>70</u>

Account of Receipts and Expenditure of the Zarsho-Selo Railroad Company, from the 1st April to the 31st December, 1838.

I. EXPENSES KEEPING THE LINE AND BUILDINGS.

DR.	Rubs.	Cop.
(1) Ground-rent	6,911	23
(2) Maintenance of way :—		
(a) Repairing earthwork	6,127	96
(b) Reballasting	3,342	60
(c) Adjusting rails	6,304	27
(d) Repairs of turnplates and passing-places	178	47
(e) Maintaining bridges	1,068	93
(f) Maintaining and watch- ing crossings	6,608	48
	<u>23,630</u>	<u>71</u>
(3) Expenses watching the Line	36,536	56
(4) Maintaining the Build- ings :—		
(a) Repairs	11,000	37
(b) Insurance	5,072	59
(c) Firing	20,621	56
(d) Lighting Railway and Buildings	7,779	4
	<u>44,473</u>	<u>56</u>
		<u>111,552</u>
		<u>6</u>

II. EXPENSES OF CARRIAGE DEPARTMENT.

(1) Maintenance and repairs of Locomotives :—		
(a) Repairs	39,474	66
(b) Pumping	1,387	99
(c) Firing, coke, wood, &c.	88,037	38
(d) Tallow, oil, tow, &c.	5,470	30
	<u>134,370</u>	<u>33</u>

(2) Conducting the loco- Rubs. Cop. Rubs. Cop. Rubs. Cop.
motives :—

(a) Engineer's wages . . 12,150
(b) Firemen's ditto . . 5,503 41

17,653 41

(3) Expenses of carriages :
(a) Passenger carriages . 13,702 20
(b) Ditto for goods . . 2,335 30
(c) Grease, &c. . . . 3,407 79

19,445 29

(4) Cost and keep of
horses 3,203 35

(5) Disbursements for
omnibuses in Zarsko-
Selo 177 85

174,850 23

III. SALARIES AND SUNDRY DISBURSEMENTS.

(1) Expense of clerks and
servants :—

(a) Salaries 73,244 13
(b) Conductor's clothing . 3,272 72
(c) House-rent 3,319 31

79,836 16

(2) Sundry expenses . . 67,573 41

126,712 44

Rubles 313,114 73

CR.

By receipts of passen-
gers 768,891 40
Omnibuses 2,010 40
For goods 1,761 95

772,663 75

Rents for the Vauxhall at
Pawlofsk 3,641 75

Restauration at Zarsko-
Selo 7,575 35

Do. St. Petersburg . . 3,449 98

Market gardens . . . 1,100

15,767 8

Admission to Vauxhall . 914

789,344 83
Interest 8,319 77

Rubles 797,664 60

Observations on the Application of Statistics to Joint-Stock Companies. By M. L.

NUMEROUS as are the branches of science, in the promotion of which statistics have been admitted to co-operate, and able as this science has been to commerce, yet there is one branch, its application to joint-stock companies, which few, except yourself, have attempted to investigate. It is from the non-cultivation of this application of statistics, that the Legislature has been left in ignorance of the true operation of joint-stock capital, and it is only from investigation of this nature, that we can hope to redeem past errors and avoid similar mischiefs for the future.

Statistics, may, perhaps, be divided into two great sections, mathematical and physical, although both are sometimes so intermixed as to render their distinction difficult. To the first class may be referred such facts as cheapness promoting extended consumption, and similar results; and to the second, the propensities of certain classes for particular objects. The science is thus rendered general and special, and it should be the endeavour of the cultivators of the statistics of joint-stock companies to trace the application of general laws, and to ascertain the special laws which are attributed to this branch.

In your last number, page 332, you give an interesting table of the classifications of the shareholders of the London and Birmingham Railway, but it is much to be regretted that it does not enter into more *minutiæ*.

Holders of single shares.	Holders.	Number of Holders reversed.	Shares held.	Preceding reversed.
	151	4	151	320
5 ...	279	5	1395	350
10 ...	246	7	2460	420
20 ...	83	20	1660	1000
30 ...	42	40	1220	1600
40 ...	40	42	1600	1220
50 ...	20	83	1000	1660
60 ...	7	246	420	2460
70 ...	5	279	350	1395
80 ...	4	151	320	151

Arguing upon these imperfect figures, as far as possible, we find that not only are the greater number of holders to be found for the small numbers of shares, but we find that the small holders held a great portion of the whole. Shares held in numbers of 20 and under, are 5,666; shares held in numbers between 20 and 50, 3,820; shares

above 50, 1,090. Thus we find that the higher we go the less number of shares we find held, and that one-half of the shares are possessed by holders of 20 and under, confirming the views entertained by you in the leading article of your last number, page 290, as to the propriety of encouraging small holders. A similar result as to joint-stock banks is given in your fifth volume, page 361, by Mr. Hyde Clarke, from whom it appears that the amount of capital invested in shares of 20*l.* and upwards, is 1,500,000*l.*, and in shares under 20*l.*, 5,800,000*l.* In the preceding table each of the columns of the number of holders and number of shares held is reversed, so as to enable the reader to see at once the difference in strength between the small and large holders.

This seems to be a branch of the general statistical law, that what is cheapest will be most widely distributed, and it is not the only application of it to which the attention of railway managers might be called. It is established, that the cheaper fares are the greater amount is received, and it is well worth the while of some of the companies to act upon this rule. Were the fares to Birmingham reduced to 10*s.*, only from Saturday afternoon to Monday morning, the number of passengers would infinitely increase, as it would be little more than the price of a trip to Margate.

The proceedings of the Legislature as to shares have been so mischievous, that too much attention cannot be directed to expose the fallacies upon which they are founded. In the standing orders they have taken upon themselves to affirm that the shares of incipient companies are, or should be, held by permanent investors, and proceeding upon that assumption, they have thrown every obstacle in the way of what they call jobbing. The fact of it is, however, that very few investors take shares in unincorporated companies, particularly those obliged to live upon the interest, as by waiting five years before they receive a dividend, the accumulation of interest amounts to 27*l.* 13*s.* upon every 100*l.*, which most permanent investors cannot afford to lose. The shares, therefore, are taken as raw merchandize by the jobbers, in the chance of their being repaid by a premium for the loss of interest. This is confirmed by the result of the Birmingham (last number, p. 293), where we find that about 146 original shares are held by this class, and of the 146, 11 only are held by the productive classes.

From the jobbers, the shares, after the Act of Incorpora-

tion, go into the hands of another class, who hold them till a dividend is paid, when they must dispose of them at a premium to pay off their 21 per cent. accumulation of interest. It is only, therefore, when all difficulties have been overcome, that the shares are taken by 60 per cent. of spinsters, 1 per cent. of widows, 8 per cent. of lords and clergymen, and twenty per cent. of gentlemen, who sell out of the Three per Cents. at 92, to add a few more comforts to their establishment, or an additional thousand to their hoards.

If jobbing be an evil, the sound and practical way of preventing it is not by legislating against it—for any tyro in politics can tell what the result of prohibition is—but to turn investment into other channels by common sense measures; in fact, to carry out the plan suggested by you, and allow interest to shareholders as an encouragement to small investors. Of the unsound state of capital in England we cannot have a better proof than the returns from the savings banks. In England, 20 millions are locked up in these establishments, and among the provident Scotch only 1 million, for they return their capital through the banks and other sources into productive channels, and have, in the joint-stock banks alone, 20 millions on deposit at interest, or 7*l.* a-head.

M. L.

A New Formulæ for Computing the Contents of Cuttings and Embankments. By Mr. JOSEPH LOCKWOOD.

IN constructing railways it is frequently necessary, to preserve the uniformity of the gradients, to cut through rising grounds, and contrariwise, to fill up valleys to the level of the proposed road; and consequently it becomes necessary to know what quantity of materials will have to be removed in a cutting, or filled up in an embankment.

The preliminary data required for this purpose are the inclinations, which are always known from the levels, &c., and the mean or average depth of the cutting or embankment, which are known from the former, and the width of the road, that is, the upper surface, in an embankment, and the lower in a cutting upon which the rails of the roadway are laid.

The transverse area of any section depends upon what are technically called the slopes, which again depend upon the nature of the ground through which the works are to be carried; the slopes are the two inclinations over either sides

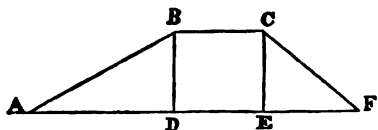
of the cuttings, &c. They depend upon the nature of the materials, &c., as already mentioned, and upon local circumstances, which are known to the engineer, who must determine their magnitude according to his best judgment, no rules for which of course can be laid down. Some soils are far more firm and tenacious than others, and will consequently require less slopes than soils of less tenacity; so that the expenses of the works in a great measure depend upon the slopes, for, in every case, the greater the slopes the greater the quantity of materials to be removed.

And from local circumstances it may occur that the slopes will have to be different on each side of the works, but more especially in cuttings, which are, in fact, embankments inverted.

To find the area of the transverse sections of such works, from whence to deduce the cubic contents, is sufficiently easy and direct in application, especially when, as it mostly happens, the slopes are equal on either sides. What I propose doing is, to investigate a rule for this purpose, when the slopes are unequal, so as to embrace every case that may occur in practice, which I think is desirable.

In the case of embankment on side slopes rules might be investigated, but they would be much too long ever to be practically applied; and for such cases I would recommend a construction to scale, and measure the quantities; or, which is the common custom, allow a per centage.

Let the annexed diagram represent an embankment, and if inverted, a cutting, then AB and CE are the slopes, forming



two solid wedge-like figures ABD and CEF , the contents of which, added to the central solid, gives the total solid content.

The slopes are said to be two to one, three to one, &c., where AD is twice, thrice, &c. BD , and so on in any other ratio. And obviously AD is a multiple of BD , and similarly for the other side; it consequently follows that we shall have two terms of the form $m \times BD$ and $n \times CE$, where m and n depend on the slopes, and are determined by proportion, as follows:—

$$\text{Base } AD : \text{height } BD : m : 1$$

$$\therefore \frac{AD}{BD} = \frac{m}{1} = m$$

and precisely the same for the other slope, from which we have $AD = BD \times m$ always.

And by computing the area of the two triangles with bases as above determined, we have—

$$\frac{BD \times m \times BD}{2} = \text{area of triangle } ABD$$

$$\frac{CE \times n \times CE}{2} = \text{area of triangle } CEF$$

$$BD \times DE = \text{area of central rectangle,}$$

and the sum of these three quantities is the total area required; whence the formula becomes—

$$\frac{BD \times m \times BD}{2} + \frac{CE \times n \times CE}{2} + BD \times DE = \text{total area.}$$

$$= \frac{(BD)^2 \times m}{2} + \frac{(CE)^2 \times n}{2} + BD \times DE = \text{total area,}$$

and which is the formula required.

Example,—Given the width of an embankment 30 feet, and the depth 40, one slope being 2 to 1, and the other 3 to 1, required the transverse area.

$$BD = CE = 40, \quad BC = DE = 30 \quad \left. \begin{array}{l} m = 3 \\ n = 2 \end{array} \right\}$$

$$= \frac{1600 \times 3}{2} + \frac{1600 \times 2}{2} + 30 \times 40 = 5200 \text{ total area.}$$

When the slopes are equal, then the formula becomes—

$$\left\{ 2 \left(\frac{(BD)^2 \times m}{2} \right) + BD \times DE \right\} = \left\{ (BD)^2 \times m + BD \times DE \right\}$$

If we call Δ the average depth of the cutting, &c., the formula may be generally expressed as follows:—

$$\frac{(\Delta)^2 \times m}{2} + \frac{(\Delta)^2 \times n}{2} + \Delta \times DE \Big\} = \text{area.}$$

From which a series of tables might be expeditiously computed, so that by entering the table with the above given quantities as arguments, the total transverse area might be taken out at once, which would be the solid content of the figure to unity of length; hence, multiplying this quantity by the length, the actual solid content would be thus directly obtained.

J. LOCKWOOD.

Camden-hill, June 3d.

RAILWAY OPENINGS.

Aylesbury Railway.—This branch to the Birmingham line from Aylesbury, was opened June 10th. Except at the termini, this line is nearly straight, and $7\frac{1}{2}$ miles in length.

Brandling Junction Railway was partially opened by the directors and a large party of friends, June 18th; the general opening is to take place in September. The part now opened is between South Shields and Sunderland.

The company dined at Monk Wearmouth, and fortunately reached South Shields in time to avoid the drenching which fell on the openers of the Newcastle and North Shields party.

The Brandling Junction Railway was first projected by Robt. Wm. Brandling, Esq., of Low Gosforth, whose name it bears. It unites the towns of Gateshead, South Shields, and Sunderland, and derives the second portion of its title from that circumstance. The importance of the line, both locally and in a national point of view, is at once obvious, from the fact of its forming a railway communication between the Tyne and the Wear, on the east coast, and of its completing the communication by railway between the German Ocean and the Irish Sea, by its junction with the Carlisle line at Redheugh, the western terminus of the Carlisle line joining the projected railway from Carlisle to Maryport. An arrangement subsequently noticed, whereby this line will be made to join the Sunderland and Durham, Clarence, Darlington, and Stockton railways, and thereby form the best mode of communication with all the places on those lines respectively, and at a cheaper rate than at present, will add to its importance in every respect, as there can be no doubt it will become the principal line of communication by the Great North of England Railway with the metropolis itself. The works were begun at the Felling, in August, 1836, and it is expected that the entire line will be completed and opened to the public on the 1st of September in the present year.—(Abridged from the *Newcastle Journal*.)

Croydon Railway.—This line was opened on the 1st of June. Cards had been issued out to near 200 ladies and gentlemen, including the Lord Mayor, Lady Mayoress, the Archbishop of Canterbury's lady, several M.P.'s, and some of the Select Committee on Railroads of the House, engineers, and friends to the railway system, who kept arriving at the railway station, London-bridge, until about one o'clock, when the first train started. The second went a few minutes after, which stopped at one of the stations on the line for $1\frac{1}{2}$ minutes, and reached Croydon, $10\frac{1}{2}$ miles, including this stoppage, in 31 minutes exactly.

After viewing the extensive station at Croydon, with its engine-house, warehouses, offices, &c., which are excellently arranged, and contain every comfort that can be desired, the party returned to the New Cross station, near the junction with the Greenwich line.

This is the grand depot for coals and goods expected to be received by the Surrey Canal, and also for the repair of the engines. The design and execution of the large octagonal engine-house, were much admired, as well as the other buildings in connexion with it. During the stay of the party here, a band of music in the centre of the octagon played at intervals for the amusement of the company, and the effect from the reverberation of sound by the walls was truly grand.

Having stayed for a considerable time here, three trains conveying the Croydon, Brighton, South-Eastern, and Greenwich directors, with their visitors, united in one, and proceeded to the various stations on the road. But the party did not generally get out until they arrived again at Croydon.

Here an elegant cold collation was provided, in the large shed for the arrival and departure of the trains, which had been fitted up for the purpose. With the exception of a slight interruption, occasioned towards the close of the day by Capt. Page accusing John Moxon, Esq., the chairman of the Croydon Company, with having disgusted the Greenwich and South-Eastern directors by his conduct—in what, no one could tell, for Mr. Moxon is generally considered to have the wrong heart and mind to offend any one—the good humour and harmony of the day were perfect. Hisses and strong expressions of indignation soon silenced the Captain, who, afterwards becoming sensible of having acted under a delusion, made a proper apology to Mr. Moxon. Mr. Gibbs, the engineer, was unfortunately ill, and confined to his house.

The original estimate for a line to Croydon was 140,000*l.*, but that was for a very different line from the present, and exclusive of stations. The present line will cost 500,000*l.*, of which 100,000*l.*, at least go for the stations (which are on an extensive scale, but not more so, probably, than the line requires), and 40,200*l.* for the purchase of the Croydon Canal.

For $1\frac{1}{2}$ miles from London-bridge, the Croydon trains pass over the Greenwich line, which the Croydon joins by a viaduct. At this junction is an octagonal light-house, with powerful parabolical reflectors, from which signals by coloured lights can be given a long way off to approaching trains, so as to prevent the chance of collision. Just after passing the junction, the company have extensive and commodious wharfs for the landing of coal from the canal, in order to take it to Croydon and other places. About $1\frac{1}{4}$ miles from the junction, is the New Cross station. To this point the line has been descending with a slight inclination, and just at the end of the station it passes under the turnpike-road, and thence enters a deep cutting, and an incline of 53 feet per mile, for above $2\frac{1}{2}$ miles. This is by far the heaviest work on the line, and the soil is by no means good in many places. When the incline is once ascended, the line proceeds on table land, and almost a dead

level, to the very town of Croydon, $10\frac{1}{2}$ miles from London-bridge. It is on this part of the line that the scenery is so charming. On the Greenwich Railway the prospects are rich and varied, but here they are truly beautiful; while the changes of scene are so numerous, and objects belonging to apparently such different parts of the kingdom are so unexpectedly mixed up, as to keep the mind in a constant state of pleasing agitation.

In our last we stated that the Croydon Railway was likely to become a favourite one with the Londoners, on account of its beautiful scenery. This has been already shown; for though not a single one of the 16 coaches each way has been taken off the road, there travelled in the first week, 14,447 passengers, producing 868*l.* 1*s.* 5*d.*; in the second, 15,312, producing 878*l.* 7*s.* 7*d.*; and the receipts are still increasing.

Besides culverts and the viaduct, the line passes over 4 bridges and under 11.

We were promised a particular description of the works and most prominent features of this railway, on which we depended, or we should have sent some one over it for the purpose. But our friend has not kept his word.

Eastern Counties Railway.—Tuesday, June 18th, a portion of this line from the temporary terminus at Devonshire-street, Mile-end, to Romford, $10\frac{1}{2}$ miles, was opened by the directors; the Persian Ambassador, and a large party of about 400 to 500 noblemen, members of Parliament, distinguished scientific men, engineers, and railway gentlemen. The company departed in two long trains, side by side, on the two lines, a little after half-past one, amidst a band of music playing our national air, the discharges of cannon, and the acclamations of assembled thousands. At Stratford the party got out. The station here is certainly a very neat specimen of brickwork, but the crowd of visitors and lookers-on was so great, that we could get no opportunity of seeing much of the plan and arrangement. At present it is unfinished.

Arrived at Romford, we partook of an excellent cold collation, which was so amply spiced with cordiality, kindness, and good humour, that all were highly pleased. The party having well enjoyed themselves, returned to town, and, owing to the care and judicious arrangements, not the slightest accident occurred.

We understand the directors have determined to defray the expense of this opening, amounting to, we should think, at least 400*l.*, out of their own pockets. Though this is a stretch of fine feelings, highly honourable, it must be admitted, to the directors, it is one of which we cannot see the necessity.

The carriages are chiefly on the plan of the Grand Junction, of a transparent blue, and are very comfortable vehicles. Some of them, however, are not well constructed on the wheels and axles, and should be looked to. In others the travelling is very smooth,

which shows that the fault lies in the carriages, and not in the road, which had the appearance to us of being firmly and evenly laid.

A larger concourse of persons we never witnessed at the opening of any line, which is a proof of the great interest it has excited. Indeed, it must be acknowledged to be the beginning of a most important era for the counties of Essex, &c.

Historical Sketch of the Undertaking.—In 1833 or 1834, the idea of a line to Norwich and Yarmouth was started. A sort of ocular survey was made; but some of the parties having found their way into the turnkey's safe (so the ex-sec. informed us), from electioneering pranks, the project dropped. In the summer of 1835, so fruitful in railway projects, no less than three lines were projected to Norwich and Yarmouth,—the present one resuscitated, and, for the most part, with a different set of persons; another by Mr. Gibbs, as part of his Great Northern line; and a third from the Northern and Eastern Railway. Mr. Gibbs and the other company having given up their projects, the present company succeeded in obtaining a Bill, which received the Royal Assent July 4th, 1836, to make a line of railway from Shoreditch, through Ilford, Romford, Chelmsford, Colchester, Ipswich, and Norwich, to Yarmouth. It was during the brief progress of this Bill through the House, that Lord Petre managed to bind some of the directors to pay him for land—which we think any man would have considered well sold at 3,000*l.*—and an alleged damage, 120,000*l.*!!! This same good Catholic and patriotic nobleman, who thus showed his disinterested desire to forward an undertaking to benefit the county he lives in, did also, as appears by our solicitor's bill, generously take of us 2*l.* on a subpoena to attend a trial in which we had been involved, in defending his supposed harsh treatment. The total Petrean benefit by this line is, therefore, 120,002*l.*

The following sketch of the railway and works to Romford, is abridged from one given us by a gentleman well acquainted with it :—

Description of the Eastern Counties Railway from London to Romford.—“The line of the Eastern Counties Railway commences at Shoreditch, on a viaduct about twenty-one feet above the level of the ground. In this viaduct are several archways or bridges faced with stone, which gives them a handsome and imposing character, such as Charles-street bridge, and the bridge over Devonshire-street, adjoining the temporary station. This last bridge is oblique, and the arch rises less than one-tenth of the span. There are also several iron bridges in course of execution, of very considerable span and great obliquity, of a plain but handsome character. The whole of the arching of the draining has been effectually protected from the effects of damp, by a thick

coating of asphaltum ; so that the arches may be used for warehouses, and a large income be secured to the company.

“ From the termination of the viaduct, the line passes along an embankment formed from side cutting to the Regent's Canal, over which it passes by an iron bridge. Two main ribs of iron of fifty-four feet span, partly on the bow-suspension principle, are thrown over the canal, to which transverse girders are fixed, supporting the roadway, on which are laid longitudinal sleepers of timber receiving the rails. An embankment now carries the railway to the river Lea, passing over Grove-road, Coborn-road, Fairfield-place, and Old Ford-lane bridges, besides other smaller archways. The Lea bridge is of an elliptical form, the span being seventy feet, and the rise one-fourth, or seventeen and a-half feet only. In the progress of this work, considerable difficulties were experienced in consequence of the want of solidity in the under strata. From the river Lea bridge, an embankment of twenty-five feet in height, carries the railway over the Stratford marshes, passing for a considerable distance within a few feet of one of the extensive reservoirs of the East London Waterworks. Considerable difficulty was experienced in the formation of this embankment, owing to the very unstable nature of the ground on which it was raised, being, in fact, a mass of spongy vegetable matter to a very considerable depth. On this part of the line there are numerous bridges over the various rivers and streams which the railway intersects, some of which are of considerable magnitude, such as the Stratford viaduct, of five arches, each of thirty-six feet span. The Mill Pond bridge, of forty-six feet span ; Stents Mill bridge, of four arches ; and the Abbey River bridge, all of which are over tidal currents : besides numerous other smaller archways. The Stratford station is erected after the style of a plain Italian villa, with extensive and commodious waiting-rooms, carriage-shedding, engine-house, and repairing workshops for the engines. The line now passes from embankment into cutting, which continues nearly to Ilford,—the depth varying from ten to twenty feet. Over this part are numerous bridges, the principal of which are, the Leytonstone turnpike-road bridge, having a width of roadway over it of fifty feet. There are also bridges over Water-lane, Forest-lane, Forest-gate, an ornamental bridge over the railway in Mr. Fry's park, East Ham bridge, and Wanstead road bridge, besides numerous occupation archings and culverts. The line now passes a lane on a level, a paved crossing, and gates serving the purposes of a bridge, and immediately beyond, the railway passes on to an embankment of about twenty feet in height, across the Roding or Ilford valley, crossing the Aldersbrook and Roding streams, on bridges, each of forty feet span, and then once more passing into cutting, you shortly arrive at the Ilford station, now executing, of a pleasing character, with extensive accommodation

for the public. The approach to this station is in the centre of the town of Ilford, from which the roads to Barking on the south, and Cranbrook, and various other places to the north, diverge. The line passing onwards in cutting to the bridge, or rather tunnel, at the eighth mile-stone, between which are Curtis's archway, several culverts, and the Cauliflower-lane bridge, where it crosses the great Essex road. The tunnel or archway through which the railway here passes, is 130 feet long, and 28 feet wide; the side walls or abutments are of brickwork, on which are laid iron girders, which have broad iron flanges cast on their lower part, from which small arches are turned, carrying the turnpike-road above; there are also extensive wing walls sustaining the embankment forming the approaches to this bridge. Close paling of considerable height is fixed on reverse sides of these approaches, to prevent accidents which might arise from horses taking fright when passing along the turnpike-road, and which might otherwise occur. On the whole, the public cannot but be pleased with the arrangement at this difficult point. Passing onwards, still in cutting, some engineering difficulties presented themselves. The railway passes below the large stream of water known as the Seven King's Brook. This is ingeniously got over by constructing culverts with immense iron pipes, similar to a syphon tube, through which the water is passed. The railway continues in cutting to Whalebone-lane, passing under Barley-lane bridge, and over Chadwell culvert, under Chitt's-lane and Whalebone-lane bridges, where it arrives on a level, and at which point coke-sheds, water-tanks, and an engine-house, have been erected. The railway now passes on an embankment to Romford, passing over the bridge at Cap-hall, Nursery-chase, Barrack-lane, and the river Rom; the last-named structure being an elliptical arched bridge in thirty-two feet embankment, and of suitable strength.

"The portion of railway at present open to the public, terminates at Barrack-lane, immediately adjacent to the town of Romford, about ten and a-half miles, which the trains will accomplish in less than half an hour. Coaches, in connexion with the trains, run to Chelmsford, performing the distance in one hour and a-half. Chelmsford is, therefore, already benefited, by the saving of nearly one hour in the communication with London. A further portion of the line to Brentwood, and the remainder of the London viaduct up to Shoreditch, will be ready for opening early in the ensuing spring."

We have had a very complete table of the gradients of this line the whole way to Yarmouth, laid before us, but so late in the month we could not use it. By it, however, it appears that there is no gradient on the part opened exceeding 16 feet a-mile; but the average seems to be about 12 or 13. With two exceptions, the gradients, by the document, all the way to Yarmouth, are very good; perhaps, for so great a length of way, unequalled.

Llanelly Railway.—A further portion of $6\frac{1}{4}$ miles were opened June 1st.

Manchester and Leeds Railway.—Experimental Trip.—May 31st witnessed the opening of about 16 miles of this railway, that is, from the company's station, St. George's-street, Oldham-road, Manchester, to the summit tunnel, $\frac{3}{4}$ of a mile beyond Littleborough. A long and very interesting account is given in the "Manchester Guardian," of June 1st, of this opening, and of the line and works; but as it far exceeds our limits, we shall confine ourselves to that portion which is likely to afford information to other companies.

"The rails laid down are, we believe, about 60 lbs. to the yard; they are of unusual form, being what are termed straight rails, having only one flange, and are laid with that flange upwards, thus T. They are laid to such a width, that, in the event of the extension lines uniting the Leeds and Liverpool and Manchester Railways at the Hunt's Bank station, the same engines, carriages, or wagons may proceed forward. The railway will have a double line of rails, with a space of six feet between the up and the down lines. At the St. George's-street station, there are to be six or more lines, exclusive of sidings; but at present only the two main lines are laid there.

"There are several novelties in the construction and arrangements of the various classes of carriages to be used on the line. The first class carriages are of the usual form, very similar to those on the Grand Junction line, both in size, shape, and in their accommodation and appointments; but they, as well as the second and third class carriages, are not distinguished by names, but by numbers. The third class carriages are to be numbered from 1 to 50; the second class, from 51 to 100; and the first class, from 101 upwards. The one we examined, of the first class, is No. 105; the bodies are of light yellow, picked with black; on the centre body are emblazoned on two shields, the arms of Manchester and Leeds; on one of the end bodies the arms of Liverpool, and on the other those of Hull. The first class carriages are all supplied with the patent wheels and axles of Messrs. Losh, Wilson, and Bell, of Newcastle-on-Tyne. Both the first and second class carriages have a wooden stage along each side, the whole length of the carriage, instead of the lower step of iron, which, besides conducing to the convenience of ladies and infirm passengers, will very much facilitate the collecting of tickets, and is likely also to act as a fender, preventing persons from getting entangled amongst the steps of a starting train. The second class carriages are of similar size and colour; they are not quite close carriages, for they have an elliptical opening (not glazed) in the centre panel of each body; and, unlike those on other railways, each carriage is separated into three compartments, having no communication with each other. Ten of the second class carriages are to be of a mixed

character, viz., the two end bodies of each carriage fitted up as a second class, and the middle body as a first class; so that in case half a dozen surplus passengers should come, both first and second class passengers may be accommodated in a single carriage, instead of involving the necessity, as at present, of putting two additional carriages to the train. The third class is a large square carriage, quite open, like the third class on the Grand Junction line, but without any seats. It has an entrance door at each corner, and is divided by a rail into four standing places. The intention of the directors in adding this class is, we understand, to give to the poorer classes an opportunity of travelling at a cheaper rate than they have heretofore enjoyed. Without speaking from authority, we may say, that we believe railway travelling will be had on this line, in the third class carriages, for something like a penny per mile.

“The company have ten engines ready for action, of which we saw two. The one which drew the train yesterday was named the ‘Stephenson,’ and was made by Messrs. Robert Stephenson and Co., Newcastle-on-Tyne. The boiler is what is called diamond-shaped, somewhat resembling a pyramid, with a conical apex. This engine is rated at 80 horses’-power, and is one of Messrs. Stephenson and Co.’s powerful six-wheel coupled engines.”

Many of the works on this line appear to be of a formidable description. Embankments of 50 and even 74 feet high, with a tunnel of $1\frac{3}{4}$ miles, and deep cuttings, must have tried the nerves of the engineer and directors. However, the report says, that all the works stand exceedingly well, and speaks highly of the beauty of the country. The near approach of the opening seems to have diffused very great pleasure and satisfaction throughout the whole district through which the line runs, and doubtless it will be of the greatest commercial service. For our part, we congratulate the directors most cordially on the progress they have made. It was only about two short years since that great fears were entertained for the completion of this valuable line, not from any doubt, we believe, that was ever entertained of its importance and prospects of pay, but from some morbid apathy that had seized the public with regard to this and several other lines. We are, therefore, the more delighted to find that there is now every prospect of the public and proprietary being early benefited by its coming into operation.

Midland Counties Railway.—Partial opening, from Nottingham to Derby.—May 30th was the day appointed for the opening of this great work; the public day was June 4th. For some time previous to the hour named for the trains to start (twelve o’clock), Nottingham poured forth its thousands upon thousands of anxious spectators, some almost covering the meadows near the line of road, others occupying the various eminences in the park, whilst hundreds more flocked to the windows and the tops of almost

every building which commanded a view of the novel and imposing spectacle. As this was only the opening to the directors and their friends, tickets of admission, bearing the arms of the company, most splendidly emblazoned in gold, had been issued to some four or five hundred. The sides of the road, for almost the whole distance, were lined with spectators, particularly the ends of the lanes leading from the different villages contiguous to the line, which were literally crammed with anxious lookers-on. Tops of trees, roofs of buildings, spires of churches along the line, all contained something in the shape of living forms, who seemed to have hazarded their necks on purpose to have a sight of the rapidly moving trains. We must not neglect to give an account of the time as it sped, with reference to the distances performed. The train was put in motion amid the cheers of the spectators, and the band playing "God save the Queen," precisely at 27½ minutes to one o'clock. At 18 minutes to one, arrived at Beeston; 12 minutes to one, arrived at Long Eaton station-house; 9½ minutes to one, crossed the canal; 7½ minutes to one, arrived at Sawley; 4½ minutes to one, arrived at Breaston; 3 minutes to one, at the first archway on the line; 2 minutes to one, stopped at the station (about half-way), to take in water, which occupied about two minutes; at 11 minutes past one, at Spondon; and at 18 minutes past one, at Derby; the distance having thus been performed in about 45 minutes. Here (at Derby) we found hundreds of gaily-attired spectators occupying heights commanding a view of the arrival, similar to our friends at Nottingham, who witnessed the departure. Here, also, the bells rang "right merrilie," and joy and mirth prevailed. After remaining about an hour, we proceeded on our return, accomplishing the distance to Nottingham, in 42 minutes, where we were ushered into the spacious area amidst repeated cheers, and the soul-stirring strains of the excellent band, which struck up "See, the conquering hero comes." The whole of the party having alighted, now took their places at the tables on which the cold collation had been set out. During the refreshment, the band of the 5th Dragoons (many thanks, say we, to the gallant officers through whose courtesy we had the treat) poured forth a succession of the most delightful airs.

Towards the close of the repast,

Sir CHARLES O'DONNELL rose, and proposed as a toast, "Success to the Midland Counties Railway."

There was no mistake about the cheering which followed this toast—it was truly grand; the very roof rung again with the lofty and reiterated plaudits of the assembly.

J. DICEY, Esq., one of the directors, returned thanks, hoping this might prove the omen of their future prospects.

The Venerable Archdeacon WILKINS then proposed "The spirited proprietors of this great undertaking."

LAWRENCE HEYWORTH, Esq., acknowledged the toast, and dilated

at some length on the advantages of railway communication. As one of the proprietors of this great undertaking, he could not but feel thankful to any individual who attests his gratitude towards those who had been the means of bringing about this great consummation, and who knows how to estimate a work of this kind and character. How, then, could he avoid testifying his thanks in the most earnest manner possible, to such a number he now saw around him, who, by the interest they had taken in the proceedings of the day, showed how they appreciated the completion of a work so well calculated to advance the prosperity, not only of Nottingham and Derby, but of every town, village, and hamlet with which it communicated. Though he could not but express his fear that, even in this large town, the great and real value of such a work was not rightly appreciated, yet he felt no doubt that, in the course of twelve months, a right and proper feeling touching it would be paramount. There was no doubt they would rightly feel and duly value its merits, when they begin to find their pockets filling in a way they have never before experienced. When they find commerce increasing, from the ready mode furnished of transporting goods and manufactures from one end of the country to another, they would then look upon the completion of works like these with a degree of just satisfaction which they deserved. The speaker then alluded to the rivalry existing, in some parts of the country, between the projectors of one line and another (referring to the Manchester and Birmingham Extension Railway), which he could not but deeply regret. The Manchester road ought to have connected itself with the Midland Counties Railway, and thus have opened to that town fresh sources of traffic, the beneficial results of which could not now be adequately contemplated, for the towns and populous districts lying on the route of a railway passing from Manchester and Stockport down the Churnet Valley to Derby would, by the facilities of traffic and intercommunication this line would afford, stimulate and enrich their manufacturing industry; and not only would these towns be so beneficially affected, but also Manchester itself, and the vast and active population of all Lancashire would be thus brought into increased commercial intercourse with Nottingham, Lincoln, Leicester, and all the rich, manufacturing, trading, and agricultural communities, extending to the east and bounded by the German Ocean; besides which, this line would have the peculiar advantage of carrying the Manchester traffic for London, nearly along its ancient channel, and, in connexion with the Midland Counties Railway, be decidedly the nearest route to London. If the great national and local advantages which would accrue from the Churnet Valley line of railway be contrasted with the futile project of laying the Manchester and Birmingham Extension Railway side by side with the Grand Junction and London and Birmingham, traversing, as it does, a common, with these two railways, nearly the same range of

country, and sharing with them a considerable portion of the same traffic, at, consequently, a vast waste of national capital for no essentially useful purpose not already obtained, the profit and interest on which capital the public will, in justice, have to pay, and, of necessity, be charged with increased rates for traffic and fares for travelling commensurate therewith. But one opinion can be entertained by enlightened legislators, prudent railway projectors, and local patriots, that the Churnet Valley line is certainly the only line of railway, from Manchester to London, which will open up the resources of the important localities it connects, and confer the greatest blessings on the country at large, and will also best reward the enterprise of the capitalist. Under these circumstances it is reasonable to expect that the Legislature will, at an early period, sanction a railway, uniting the Midland Counties, at Derby, with Manchester, down the Churnet Valley, since it is plain that the pressing commercial and social requirements of the country even now demand it; and thus another stream of traffic will pour upon the Midland Counties Railway, in addition to those already contemplated from the north, east, and south, to swell the unprecedented local travelling and traffic this railway is peculiarly and prominently calculated to promote, between the populous and flourishing midland towns it unites, at short railway distances, and at consequently small fares. He trusted, when this great undertaking had proved itself to be of the highest consequence, not only to those immediately interested in it, but to the community at large, all would put forth their energies to support the projectors of it. Having at heart the welfare of this great town, he would conclude by proposing, as a toast, "The prosperity and happiness of the great town of Nottingham and its inhabitants."

DOUGLAS FOX, Esq., Mayor of Derby, gave "The Directors of the Midland Counties Railway, and prosperity to the Company."

PHILIP GELL, Esq., of Hopton, returned thanks, and proposed the health of "Mr. Vignoles, the engineer of the line," with three times three.

The latter gentleman returned thanks, but thought the honour would have fallen better upon the most talented and resident engineer, Mr. Woodhouse, who had so faithfully executed the orders he had received.

The health of Mr. Woodhouse was drunk amidst great cheering.

The following toasts were then given:—"Mr. Glynn, manufacturer of the locomotive engines;" "John Fox Bell, Esq., Secretary;" "Prosperity to the town and trade of Derby."

The Mayor of Derby returned thanks.

"The Mayor of Nottingham" was given amidst cheers, and the conviviality was kept up until the train returned to Derby with the good people of that town who had participated in the day's festivities.

The distance to Derby was performed in thirty minutes, and the return in thirty-one minutes. The distance from Nottingham to Long Eaton (six miles and a half), was gone over in nine minutes, or at the rate of forty miles an hour.—*Leicestershire Telegraph*.

Newcastle and North Shields Railway.—The "*Newcastle Journal*," which we have just received, contains long accounts of the opening of this and the Brandling Junction Railways, both on the same day, the 18th of June, from which we take our descriptions.

The Newcastle and North Shields Railway starts from the Company's Offices, Pilgrim-street, and passes to the south side of the gaol, but the portion at this end is not yet completed, and terminates at Little Bedford-street, North Shields. Among the heaviest works on the line stands the Pandon Dean embankment, being seventy feet from the channel of the stream which flows below. This embankment was a very difficult work, owing to the loose nature of the soil beneath. At the end of the embankment the line passes under a stone arch, communicating between Pandon and the Shield Fields, then under the turnpike-road at Ridley Villas, and comes to the Ouseburn station, the principal one of the company. Passing under two neat stone bridges, it emerges from the cut just before it reaches the Ouseburn viaduct. This viaduct, and that over the Willington Dean, are among the most masterly pieces of art in the kingdom, and justly excited the admiration of the British Association.

The Ouseburn "consists of nine arches, five of wood and four of stone, and is no less than 920 feet in length. All the piers and abutments are built of stone, on piles, and from the water level to the spring of the arches, measure sixty-six feet in height. The span of the centre arches, which are of wood, measures 116 feet, and from the spring to the crown of the arch thirty-four feet. The stone arches are two at each end, of forty feet span; and the height from the water level to the rail is 106 feet. The peculiar construction of the wooden arches, and the means of supporting the superstructure, are deserving of especial notice. The wooden arches consist of a number of Dantzic deals, three inches in thickness, and about eleven inches in width, laid one upon another, and firmly knit together by means of oak treenails and iron bolts. There are three ribs for each arch thus formed, and the ends are fixed in iron sockets attached to the abutments, which are formed with shoulders for that purpose. All the wood employed in the erection has been carefully prepared according to Kyan's process; and felt and tar are used to fill up the interstices of the joints. The timbers which support the way rest on the crown of the wooden arches or ribs, and consist of longitudinal and transverse beams, firmly bolted together, and supported by other timbers, so placed underneath as to receive longitudinally the full weight which may fall on the particular point they are intended to stay, and distribute it over the arches and abutments. This wooden

frame work has a light and pleasing appearance when seen from a distance. The view from the railway at this part is very extensive, and richly varied.

"The Willington Dean viaduct is approached on each side by an embankment, and its construction, in principle, is similar to the viaduct over the Ouseburn. There are only seven arches, which are built with laminated timbers, the ends of which are fixed in metal sockets in the abutments, which are of stone; but it is of greater length than the Ouseburn viaduct, being 1,050 feet in length. The span of the arches are also greater, being 120 feet between the abutments, but the height to the railway level is only eighty-two feet. An extensive prospect expands before the eye of the traveller as he passes along this magnificent structure."

We believe both these stupendous works were from designs by Messrs. John and Benjamin Green, the engineer of the line being — Nicholson, Esq., who, on this short railway, has had to contend with difficulties of no common description, and has surmounted them with a perseverance and ability highly to his credit. It was intended to carry the railway by a tunnel through the town of North Shields to Tynemouth, the Brighton of Newcastle, but violent opposition has hitherto defeated it. At present the transit is made by omnibuses. After reaching North Shields, the party proceeded to dine together at Tynemouth, in a spacious tent in a field, but were most unpleasantly cut short of the enjoyments after dinner by a terrific storm, which laughed at the protection of the tent, and uncourteously soaked many of the party through to the skin.

Newcastle and Carlisle Railway.—The triumph of the directors of the Newcastle and Carlisle Railway over all the difficulties with which they have had to contend, was fully consummated May 21st, when the line was further opened from Blaydon to the former town, amidst the firing of cannon, the music of an excellent band, and the cheers of the spectators. The passage of the train across the Tyne, by the new bridge at Scotswood, was a very pleasing and interesting feature of the ceremony. — *Gateshead Observer.*

York and North Midland Railway.—The opening of a portion of this very important railway, May 29, has excited the greatest interest and delight in Yorkshire. The papers are literally full of it. One of them, the "Yorkshire Gazette," contains no less than 12 columns of closely-printed matter on this and railways in general, with a miniature map of the part from York to beyond Littleborough, about 14½ miles opened. The historical sketch of railways and the observations on locomotives are very good, and though not quite correct in some particulars, have evidently been written by one well versed in the subject. At the opening, the directors gave a very handsome breakfast and dinner, and the evening was concluded with a grand ball given by

the Lady Mayoress, his Lordship being one of the directors. It is impossible for us, within the limits with which we are confined, to do justice to the report of the opening of this line. We shall, therefore, merely observe, that about 400 ladies and gentlemen, including the directors, Lord Mayor of York, and Mayors of Hull and Leeds, were at the opening. The train moved off from York at 1h. 7m., and reached the junction (14 miles 28 chains) with the Leeds and Selby Railway at 1h. 44m., having occupied 37min. It returned slower for the purpose of permitting the parties to observe the different parts of the line. The following description of the line is from the "Yorkshire Gazette:"—

"We will now proceed to give a description of the York and North Midland line, commencing at the temporary passengers'-station immediately without the walls. Having emerged from the city walls the line crosses Thief-lane on a level, and immediately adjoining thereto is the station now in use, and a most spacious engine-house. This part of road has several lines of rails for the convenience of placing the carriages in the different positions required. The temporary station is a very spacious erection, standing on iron pillars of great height. Proceeding with a gentle curve, the railway soon reaches an elegant skew-bridge, built for the purpose of carrying the Acomb and Holdgate-road over the railway, which it crosses at an angle of 45 degrees. The arch is 30 feet span on the square, and the height from the top of the rails to the soffit of the arch is 17 feet. The bridge is built chiefly of brick, the face of the arch, the springers, string-courses, and coping are of stone. The width of the roadway between the parapet walls is 25 feet. It may here be stated; that for the convenience of the public the directors gave instructions to make the roadway across the bridge much wider than they were bound to do by the Act of Parliament. Immediately on passing this bridge the railway enters a heavy cutting, the banks of which, having been sodded several months, present a very pleasing appearance to the eye. The line proceeds with a gentle curve to Hob Moor, through alternate cuttings and embankments, where there is a cattle bridge underneath, connecting the freemen's pasture on each side of the railway. Here there is a high embankment over the brickyards near Dringhouses, and a delightful view is presented of the village of Acomb, with the church and its towering spire. On the left the village of Dringhouses is passed at a short distance, and the line continues to Askham-lane, which it crosses on the level; it then passes Chandler's Whin (a celebrated fox-cover), and skirts Askham Bogs. The next object worthy of notice is the bridge by which the York and Tadcaster road is carried over the railway, which it crosses at an angle of 37 degrees. The arch of this handsome bridge is 30 feet span on the square, the height of the arch is 17 feet, and the width of the roadway on the bridge is 30 feet. It is built of materials similar to the bridge in Holdgate-

lane, but has been more expensive on account of the road forming a much more acute angle with the railway, and the increased width of roadway. This bridge cost the company nearly 3,000*l.*, and is, like the Holdgate-bridge, a beautiful specimen of the skew-arch. Immediately on emerging from the bridge and the cutting near it, the railway traverses a number of large fields, and a view is soon obtained of the village of Copmanthorpe, which lies to the right, about a quarter of a mile from the line. The Copmanthorpe Moor, which has been recently enclosed, is passed over, and a number of occupation-roads connecting the land is crossed in this neighbourhood. After passing through a deep cutting, the village of Colton appears at a distance of about half-a-mile. Proceeding onwards the railway is crossed by a very neat bridge, at an angle of 67 degrees, over which the road leading from Colton to Appleton is carried. The arch of this bridge is 30 feet span, the height the same as the other bridges, and the width of the roadway 20 feet between the parapet-walls. A little further on an extensive cutting through the Brumber-hill is entered. This is about $6\frac{1}{2}$ miles from York, and is the deepest excavation on the line, being upwards of 20 feet in depth. The railway next crosses the Tadcaster and Bolton Percy road on a level, and at this point the village of Bolton Percy is observed on the left, at a short distance, with its ancient and noble parish church, in which are interred the remains of the Fairfax family. The beautiful square tower of this building peers above the lofty trees by which it is surrounded, presenting, with the surrounding country, a most delightful landscape. The next point worthy of notice is the embankment over the valley through which flows the Foss-brook, the waters of which are conveyed under the railway by means of two culverts eight feet in diameter; the embankment of the railway is here 20 feet high, being the highest on the line. These culverts cost, we understand, about 800*l.* The view up the valley is very pretty, but it is soon intercepted by entering another deep cutting of considerable length. After passing through it, an extensive view is presented to the spectator across the valley of the Wharfe to the high ground at Hazlewood and Towton on the right, and as far as the eye can carry on the left. The river Wharfe here presents itself, and is crossed by an elegant and massive bridge of nine arches. The centre arch is elliptical, and is of 60 feet span and 18 feet rise. The land-arches, four on each side, are semi-circular, and of 15 feet span. The piers of the centre arch are 14 feet thick, and the land-piers 4 feet 6 inches in thickness. The width between the parapet-walls is 28 feet, and the total length of the bridge is 274 feet. The railway is conveyed across the Dumber Ing to the village of Ulleskelf on a high embankment, through which are several cattle archways. The line proceeds across the village green on the level, and thence through the extensive common pastures called Ulleskelf Mires;

to connect these are several cattle archways. The lane from Barkston is next crossed, near to the village of Church Fenton, which is on the left at a short distance. The country here is very level, and an extensive prospect is presented; the ancient town of Sherburn, which stands on the rising ground in the distance is distinctly seen, and the spacious and venerable church of that place is a very prominent object. The road leading from Cawood to Sherburn is crossed on the level, close to which is a very wide and deep brook, where the company have erected a temporary watering-station. At this point, a distant view is obtained of the embankment of the Leeds and Selby Railway, near Milford, and after traversing about a quarter of a mile further, the branch from the main line curves to the left. This line is rather more than a mile in length, and proceeds on the level to the junction with the Leeds and Selby Railway, at a distance from Selby of $6\frac{1}{2}$ miles. At the junction extensive smiths' shops have been erected, and a considerable number of men are employed in preparing the rails for the remaining portion of the line.

"The gradients on the line are peculiarly favourable; in the distance of 14 miles 28 chains, there is no part where the inclination exceeds 4 feet 6 inches per mile, and on a considerable portion the rails are laid on a level. The curves are equally favourable, there being none of less than two miles radius except the branch to the junction, which is at a radius of three-quarters of a mile.

"The following table presents the distance from York to the several stations which the company have established:—

	Miles.	Chains.
York to Copmanthorpe	3	54
Do. Bolton Percy	7	40
Do. Ulleskelf	8	54
Do. Church Fenton	10	56
Do. Sherburn	12	58
Do. the junction with the Leeds and Selby Railway, near South Milford	14	28

"The distance from the junction to Leeds is nearly $13\frac{1}{2}$ miles, and from the junction to Selby $6\frac{1}{2}$ miles."

South-Western (heretofore Southampton) Railway.—June 10, 12 miles from Southampton to Winchester, and 8 from Winchfield and Hartley-row station to Basingstoke, were opened to the public by the directors, and a select party of friends, leaving only 18 intermediate miles of the whole line to be completed, which are now supplied by coaches. The fares, at present, are 21s. the whole way from London to Southampton, by the first class, and 13s. by the second; but when the line is complete these will be reduced to 18s. and 12s. The line to connect this railway with Portsmouth and Gosport is just commencing, and it is expected will

be finished early in the spring of 1841. The greatest interest was manifested by crowds of admiring and applauding spectators congregated on every spot where a glimpse of the train could be had. The new portion of the line opened is reported to be in very perfect order.—Abridged from the *Morning Chronicle*. [We intend at some future period to give, if possible, an authentic account of this great undertaking and its works.]

REPORTS.

LLANELLY RAILWAY AND DOCK.

General Meeting held June 3, at the London Tavern, in Bishopsgate-street; ROBERT BIDDULPH, Esq., in the chair.

REPORT.—The proprietors will recollect in the former reports it was stated, that from the remote localities and peculiar circumstances attendant on making a railway in Wales, the contracts could only be entered into by persons resident in that part of the kingdom, and who were men possessing but little capital, and wanting the means to obtain credit. Hence the moderate terms on which all the contracts have been taken. But the progress of the works has been perhaps necessarily retarded from this very circumstance; as the workmen under the contractor being paid low wages, and their employer not being able, from the terms of his contract, to increase or pay extra wages for extraordinary exertions, has proceeded in a way suitable only to his own interests, although every possible means have been adopted by the committee and Mr. John Biddulph, their indefatigable superintendent, to urge on the works with the greatest despatch.

Independently of this cause of delay, it must be remarked that the early commencement of the last winter, and the unprecedented wet and violent weather which prevailed from January to the end of March, have operated much in retarding the efforts of the contractors; to which must also be added, the unexpectedly unfavourable nature of a portion of the ground in contracts 5 and 6 above Ponterdulais, where quicksands occurred, requiring trouble and delay in securing a good and permanent foundation, from all of which causes the works have been protracted to the extent described. The committee have obtained from Mr. John Biddulph, the resident superintendent in Wales, an official report, in relation to the present state and condition of the works, and also his opinion as to the period when the contracts will be completed, and the line opened for traffic. It is as follows:—

“Llanelly, 21st May, 1839.

“By the 1st of June, the road will be open for traffic from the Dock to Ponterdulais, a distance of $6\frac{1}{2}$ miles. The tunnel under the turnpike-road at Ponterdulais is complete for using now, but there is some trifle for the masons to do at their leisure, but being wanted elsewhere, they have been taken off.

“The bridge over the river at Ponterdulais is finished, and the permanent way laid and ballasted in contract No. 5 for 350 yards above it. By the 1st of June we shall have commenced the permanent way by laying and completing from Ponterdulais to the commencement of No. 7 contract, which will comprise 5 miles from Ponterdulais.

“The state of the long branch, called the Cwm Amman, and turning off at about 11 miles from Llanelly, is as follows:—No 7 contract *therein* is progressing rapidly, and will be completed about the 1st of July; No. 8

is entirely completed; No. 9 (which finishes this branch) will require a little more time to complete, say by the 1st of August. The bridge called the Pontamman, I fully expect will be complete by the 21st of next month.

"The branch to Carnarvon Pits is rapidly proceeding, and we are only stopped for the land which we require from the Wilkins' property. The branch to Mr. Lewis' colliery is nearly ready for laying and completing.

"No. 13 contract, on the main line from Parkryn, is getting on very well, faster, indeed, than any portion of the line.

"I confess I have been greatly disappointed at the progress made on Nos. 5 and 6 contracts, which I fully anticipated would have been completed by the beginning of May, but the contractor has had many difficulties to contend with. In the first place, last summer was a very wet one, and he was continually delayed by the nature of the soil of the cutting, and the floods at the end of his embankment, which prevented his carrying on the works.

"It is impossible to do work of this sort expeditiously, and at the same time, cheaply. Looking at all the circumstances, I am afraid to say less than four months from this date for the completion of the main line from Ponterdulais to the end of the Cwm Amman.

"Messrs. Morris, Sayce, and Co. still continue resolute to send down coal so soon as they can get down from Ponterdulais, and I still hope to get a few wagons over before the 1st of June: other parties are talking of doing so likewise. (Signed) "JOHN BIDDULPH."

The committee having thus fully offered an exposition of the causes of the delay, proceed to observe, that it is certain even if the line had been completed in the early part of the present year, few, if any, of the collieries would have been at that time in a condition of forwardness to bring coal down for shipment. In this point of view, therefore, but little, if any, loss has been sustained; whilst, from the ordinary progress of the contractors, the money saved to the company by the very moderate terms of the contracts, becomes an object of considerable importance in the amount of outlay as sunk capital in the formation of the railway.

Although it has been stated in former reports that the mineral produce of the district intersected by the railway, is great and various, it may be allowed to the committee on the present occasion to state, for the information of such of the shareholders as have within the last year joined the company, that coal (bituminous and non-bituminous), anthracite and culm, are found in abundance, and chiefly of the best quality; whilst iron-ore, lime-stone, and agricultural produce are lying immediately contiguous to the line of railway, and copper works projected in the neighbourhood, near to one branch of the line. It is from these general views that the committee have made their estimate of eventual results, whilst the preparations of certain coal-owners and others in opening and preparing their collieries have enabled the committee to calculate on certain returns as applicable to particular periods. The progress of the railway having shown that its completion to its present extent is rapidly approaching, has had the effect of quickening the somewhat tardy movements of proprietors of mineral produce on the line, whose arrangements are now marked by a proper activity and exertion. Amongst these may be numbered the proprietors of the Gorsy Garnant Collieries, the Cwm Amman Company, and Mr. Joseph Martin; all of whom will be ready to send down to Llanelly, on the completion of the railway in September, a considerable quantity of coal and culm; and in the next year a much greater supply, including iron from the Cwm Amman Company.

In order to include the valuable collieries in the branch leading off the main line at about 12½ miles from Llanelly, the committee have lately entered into contracts for carrying on the main line 1½ mile further, viz., from Parkrhyn to Duffryn Lodge, and thus to make the branch alluded to (about 2 miles in length), up to Messrs. Morris, Sayce, and Co.'s, and Mr. Long Wrey's collieries, both of which are now in a state to send down anthracite and culm; and by the time that this portion is completed, it is calculated that the collieries referred to will be in a condition to convey down the railway at least 25,000 tons each in the ensuing year.

The committee are also (as will be observed by the report already read from Mr. J. Biddulph) engaged in making the branches to Spitty Bridge, and also to the Carnarvon colliery, which works will be the means of bringing down for shipment at Llanelly the produce of bituminous coal, from pits in that direction. From the preceding statement, the proprietors will perceive that the committee of management have had no alteration or abatement in their views and calculations as to the quantity of produce to be brought down the line, or returns of profit for the capital invested. They feel the same confidence in the successful results of the railway as they have expressed on former occasions,—although they are bound to admit that those results may be, as they have been, affected or modified by time, in their realization.

Applications having been received from coal-owners to know if the company would provide the means of hauling the produce down the line, and looking to the auxiliary advantage of locomotive power, as well as upon calculations of a fair profit for such outlay, the committee have contracted for the construction of two locomotive engines, the first of which the contractor is under an engagement to deliver by the 1st of next September, and the second by the 1st of December ensuing.

The whole of the bars, chairs, &c., required to complete the extent of the permanent way, involved in the present contracts, viz.: about 22 miles, have been delivered, and nearly all paid for, whilst the entire quantity of sleepers required have been used, and the stone blocks regularly quarried and supplied from the immediate neighbourhood as the work proceeds.

The committee have to state, that from experimental observation they have been convinced the accommodation for the increased shipping that must resort to the dock and basin on the opening the new line, is not at present such as will enable the company to ship the quantity of produce that will be required. They accordingly, in March last, engaged Mr. George Rennie to proceed to Llanelly, and to make an engineering report as to the additions or alterations he would advise—having regard to an economical and limited outlay. The committee have adopted the site of the proposed additions, recommended by Mr. Rennie in his report, and are now about to let, by contract, the new works, on the south side of the channel, by which at least three additional shipping stages (independently of the two already in the outer basin) will be erected for the accommodation of vessels of a middling class of tonnage, whose chief object is to take in and discharge their cargoes with despatch.

In regard to the returns of profit for the last year, it will be perceived, that as no tonnage has been yet brought down the new line, that the net profits must necessarily be derived as heretofore, solely from the old or existing short piece of railway of about two miles, leading to the Llangennech and Messrs. Sims, Nevill, Williams, and Co.'s collieries. The committee, however, have the satisfaction to state that such returns are larger than at any former period, and would have still increased had not an accidental stoppage in the Llangennech colliery, and a closing of the dock

for a fortnight for cleansing, during the last year, operated in reducing the returns in a proportionate degree.

There now remain 480 shares to complete the entire number authorized to be issued by the authority of the Act of 6th of William the Fourth, which the committee conceive should be allotted only to the present proprietors, and that the committee should be empowered to consider especially the best and fairest mode of effecting this object.

Dr. <i>Balance-sheet to the 28th April, 1829.</i>		£.	s.	d.
Received from proprietors, &c., on calls		137,132	9	6
To balance of profit for the year		2,640	18	1
		<hr/> £139,773 7 7 <hr/>		
Cr.		£.	s.	d.
By cash disbursed on works		124,648	10	11
Sundry amounts for dues owing to the company		1,510	8	10
By balance at bankers'		13,434	7	10
		<hr/> £139,593 7 7 <hr/>		

GREAT NORTH OF ENGLAND RAILWAY.

Sixth Half-yearly General Meeting, held, pursuant to their Acts of Incorporation, at the Company's Office in Darlington, on Tuesday, March 5th, 1839; H. STOBART, Esq., in the Chair.

REPORT.—The unavoidable delay attendant on obtaining the two Acts by which the Company is incorporated, the subsequent negotiations with land-owners, and the necessary arrangements preparatory to commencing the works, have hitherto rendered the Reports of the Directors little else than developments of their proposed measures.

They have now the satisfaction of reporting that a considerable extent of the most material works, on the southern division of the line, has been executed; and that of the remaining portion, the greater part is in operation; and, notwithstanding the difficulties which have been experienced, and which may still exist, the Directors feel assured that the following statement will be received with satisfaction by the great body of Shareholders, containing, as it does, not anticipations that may not be realized, but an account of work actually performed.

Some time ago an abstract of the instalment account was laid before the proprietors, showing a serious amount of deficiencies in the payment of calls; and it was then hoped that the measures which were in progress for securing their discharge, would render any penal or compulsory steps for that purpose unnecessary. To a certain extent this expectation has been fulfilled, and arrears on a great number of Shares have been paid up; but, as there are still many Shareholders more or less in arrear, the Directors have come to the resolution of immediately taking such final steps in reference to those parties as they trust may secure the early payment of the deficiencies.

The Directors, being anxious to complete the southern division of the line, simultaneously with the finishing of the other great railways south of York, have availed themselves of the powers granted by the last Half-yearly General Meeting, and advertised for loans; and, that no delay might occur in putting into immediate operation the most important works, they have advanced among themselves, or by their personal friends, about 50,000*l.*, on security of the Company's bonds; and from the readiness which the public feel to invest capital on railway security, they entertain little doubt of being able to carry forward with energy the works now let, without making the calls press too heavily on the Shareholders during the current year.

TEES BRIDGE.—This important structure forms the key to the whole undertaking. Its design and execution have been entrusted to Mr. Henry Welch, county bridge architect for Northumberland, as engineer, and to Messrs. Dees and Hogg, of Newcastle, as contractors. Mr. Welch reports, that the unusually flooded state of the river on many occasions since the bridge was begun, and the limited space on which the contractors had permission to lay materials, have very seriously retarded their operations. The latter inconvenience will now be remedied, under the provisions of the Company's Acts. The south abutment and all the piers are now considerably above the summer water level, and the north abutment is rapidly advancing. Mr. Welch states that the masonry, so far as it has gone, is executed in a substantial and superior manner throughout, and will bear the strictest practical examination.

OUSE BRIDGE.—This is the only other work of any considerable magnitude on the Yorkshire line. The architect is Mr. Green, of Newcastle; the contractors are Messrs. John and Joseph Welch, of Gateshead, well known as the builders of some of the finest bridges in the North of England.

The frequent floods have proved of great inconvenience in this work also; and the unsoundness of the bed of the river has rendered additional coffer-dams necessary in founding the piers, and consequently retarded the masonry. Both abutments are within fourteen feet of the level of the railway, and the north pier is in progress. Mr. Green has expressed to the Directors his hope that, notwithstanding the unavoidable delay above alluded to, the work will be finished within the time limited by the Contract.

LAND.—The whole of the land required on the line south of Darlington is now agreed for, with a few trifling exceptions. The aggregate amount of the purchase-money will exceed the estimate by the sum of 3,500*l.* only, which in a length of nearly forty-five miles, is a case almost without a parallel. The special compensation to certain landowners, with the purchase of extra land, and land for stations, will amount to 18,500*l.* more.

CROFT BRANCH.—The Croft Branch of the Stockton and Darlington Railway, forming part of the north division of the line, has also been purchased; the sum finally settled to be paid as the purchase-money, including several pieces of land contiguous to the branch, and the depots and other premises at Croft, is 20,000*l.*, which is to be paid in four equal instalments at eighteen months, two years, three years, and four years respectively, from the 1st of January in the present year, with interest at 4½ per cent. from the time of taking possession. The length of the branch is 3½ miles. Public safety will require two bridges to be erected where the branch crosses the Stockton turnpike-road and the Hurworth highway. Although the Directors had, from an early period, resolved to erect the above-named bridges, yet, to satisfy the magistrates and the public that such was their intention, they gave a pledge to that effect, which they call upon the present Meeting to confirm by a declaratory Resolution on the subject.

STATION AT YORK.—An amicable and satisfactory arrangement has been made with the York and North Midland Railway Company, for uniting with them in the erection of a joint coach station, within the city walls at York. Land for a merchandize station, for coal depots, and for general purposes, has been purchased outside the walls, adjoining Thief-lane, with ample frontage to the river; and a Memorial has been addressed to the corporation of the city to grant a road through the walls, so as to give the citizens the advantage of an easy approach thereto. Plans for other stations are also in progress.

MATERIALS.—Fence railing, wooden sleepers, oak pins, and the other minor materials, are freely supplied at moderate prices.

Stone Blocks have been delivered to a great extent; and there are so many new quarries now opening out, that a full supply of this article, at moderate prices, may be safely relied upon.

In addition to the contract for 4,000 tons of iron rails and chairs, pre-

viously reported, a further contract with the British Iron Company, for a like quantity, has been entered into, at 11*l.* 12*s.* 6*d.* per ton.

Two pattern locomotive engines are to be delivered to the Company, by Messrs. Hawthorn, of Newcastle, in the course of this month,—one for swift trains, the other for merchandize; and the Directors will endeavour to arrange so that an adequate supply of locomotive power, of the most efficient description, shall be ready by the time the line is opened.

LINE NORTH OF DARLINGTON.—Pursuant to the powers granted by the last Half-yearly General Meeting, a Bill has been introduced into Parliament, for extending the time for purchasing land, so as to give effect to the original intention of the Company respecting a line to the north.

FORMATION.—The Report of the Company's Engineer, which is annexed, will enable the proprietors to judge of the progress of the several contracts to the close of last year, and of the present state of the works.

Having thus entered, with perhaps unnecessary minuteness, into a detail of the several departments of the Company's affairs, the Directors feel it their duty to press on the Shareholders, and more particularly on those who reside at a great distance, the importance of making themselves fully acquainted with the merits and character of this undertaking, which, from its position, connexions, and extent, must certainly be considered a national line. It is undeniable that some of the proprietors have, from their great distance from the scene of operations, known little of its nature and resources, and have consequently been to some extent indifferent as to its completion. If such persons will take the trouble to inquire minutely into the subject, the Directors feel assured that the result of their inquiries will be to secure the zealous and energetic support of those who are the most deeply interested in its completion.

The receipts and expenditure of the Company, to 31st December, are stated in the annexed table.

Pursuant to the Act, the following Directors retire at this Meeting, but may be re-elected—viz., Messrs. G. H. Wilkinson, H. Stobart, C. H. Elsley, T. Cargill, H. P. Smith, and William Losh.

The Directors, in noticing the retirement of their Secretary, Mr. Miller, feel bound to express their sense of the valuable service he has rendered to the Company ever since its formation; and at the same time they beg to inform the proprietors that they have appointed Captain Donatus O'Brien as his successor.

By order of the Directors,

D. O'BRIEN, *Secretary.*

RECEIPTS.

	To Dec. 31, 1837.			In 1838.			Total.		
	£.	s.	d.	£.	s.	d.	£.	s.	d.
Paid on calls, payments in advance, and interest . . .	60,015	7	3	97,061	9	11	157,076	17	2
Rent of premises, &c. . . .	9	2	5	5	15	0	14	17	5
The Company's notes	10,000	0	0	12,649	7	0	22,649	7	0
Loans on debentures . . . .	..	..	..	17,600	0	0	17,600	0	0
	70,024	9	8	127,316	11	11	197,341	1	7

DISBURSEMENTS.

	To Dec. 31, 1837.			In 1838.			Total.		
	£.	s.	d.	£.	s.	d.	£.	s.	d.
Parliamentary expenses . . .	9,364	1	1	40	0	0	9,404	1	1
Engineering, surveying, &c. .	10,594	10	3	5,024	8	1	15,618	18	4
Law Charges	5,220	8	0	4,921	9	0	10,141	17	0
General Disbursements . . .	3,961	0	7	305	9	9	4,266	10	4

	£.	s.	d.	£.	s.	d.	£.	s.	d.
Printing, stationery, and advertising	1,360	15	7	860	11	3	2,170	6	10
Direction	1,268	7	0	696	6	0	1,964	13	0
Deputations and travelling expenses	336	13	6	173	5	11	609	19	5
Salaries, agencies, and commission	1,028	10	3	1,446	13	3	2,475	3	6
Office rent and office furniture	486	17	1	115	2	0	601	19	1
Land and compensation	25,160	15	3	64,795	4	11	89,956	0	2
Contract work, on account	950	0	0	50,582	8	0	51,532	8	0
Interest and discounts . . . . .	..	..	..	2,600	8	0	2,600	8	0
Amounts	59,680	18	7	131,561	6	2	191,242	4	9
Balance on hand, 31st Dec., 1838							6,098	16	10
							£197,341	1	7

The above Report having been read from the chair, the following Resolutions were severally proposed, and carried unanimously :—

“ 1st. That the Common Seal of the Company be affixed to the Register of Proprietors now exhibited. (This was immediately done, and the Register exhibited to the meeting.)

“ 2d. That the Report of the Directors now read be received and adopted, and that it be printed and circulated, together with the Resolutions of this meeting, among the proprietors.

“ 3d. That the Directors have the full sanction of this meeting for adopting, without further delay, such steps in reference to unpaid instalments as they may be advised.

“ 4th. That this meeting approves and confirms the arrangement made by the Directors, for purchasing the Croft branch of the Stockton and Darlington Railway ; and also the Resolution of the Directors, as to erecting bridges for crossing the two public roads which are intersected by the present Croft branch, so soon as this Company is in a position to do so.

“ 5th. That the following six Shareholders be appointed Directors, to take the places of the six gentlemen whose term of directorship has expired, viz. :—Messrs. G. H. Wilkinson, Henry Stobart, Thomas Cargill, C. H. Elsley, H. P. Smith, J. C. Hopkins.

(Signed)

“ H. STOBART, *Chairman.*”

ENGINEER'S REPORT.

Contract No. 3, County of Durham.—Length, 192 chains.

All the contract bridges are finished, as well as two accommodation bridges, which, with two others now in construction under the Croft branch Railway, are all the works of this description on the Contract. About two-thirds of the earthwork are done.

Contract No. 4, County of Durham.—Length, 61 chains.

All the contract bridges are completed. The embankment is carried as far as is practicable until the Tees bridge is further advanced, and to which it forms the northern approach. About two-thirds of the excavations are performed.

Contracts 1 and 2, Yorkshire.—Length, 422 chains.

One contract bridge on No. 1 is ready for receiving the cast-iron platform and appendages, which are in a forward state. This bridge crosses the Dalton road, near Croft. About one-third of the earthwork is performed ; a part of it must be delayed till the bridge across the Tees is further advanced, to which this contract forms the approach from the south. On No. 2, two culverts and one accommodation bridge are finished, and one-fourth of the earthwork.

The above two Contracts were let to the same contractor ; there has been some delay on his part, which the measures now adopted may, it is hoped, in some degree remedy.

Contracts 3 and 4, Yorkshire.—Length, 212 chains.

Both are let to one contractor. Four culverts and two accommodation bridges are finished, and about two-thirds of the earthwork in No. 3, and one-twelfth in No. 4.

Contracts 5 and 6, Yorkshire.—Length, 196 chains.

Both let to one contractor. The line is fenced off, and one accommodation bridge is commenced. The quantity of earthwork hitherto performed is small, owing to the work having only recently been let.

Contract No. 7, Yorkshire.—Length, 198 chains.

Five contract bridges are in a forward state, besides one accommodation bridge and a cattle arch. The excavation has been retarded by the great quantity of masonry in the Contract, and a want of hands. About one-third is done.

Contracts 8, 9, and 10.—Length, 458 chains,

Are proposed to be let in the month of March. The amount of work on them will be slight.

Contract No. 11.—Length, 429 chains.

Four contract bridges and three accommodation bridges are in progress, and three small culverts are finished. About one-third of the earthwork is performed; a delay has occurred on this Contract, owing to the inability of the contractors to proceed. It is now in other and abler hands.

Contract No. 12.—Length, 170 chains,

Is proposed to be let at the same time as 8, 9, and 10.

Contracts 13 and 14.—Length, 433 chains,

Have been very lately let; the works are not yet begun; the line is being fenced off.

Contract No. 15.—Length, 176 chains,

Is recommended to be let at the same time with 8, 9, 10, and 12.

Contracts 16 and 17.—Length, 458 chains,

Were let last December; little progress has been made during the winter. Two contract culverts are begun, and a small quantity of earthwork is finished; Nos. 16 and 17 adjoin the Ouse bridge at Poppleton, and form the northern and southern approaches to it.

Contract No. 18.—Length, 85 chains,

Comprising the remaining portion of the main line and the branch to York, is proposed to be let in April next; the negotiation with the York and North Midland Railway Company, for uniting with them in the erection of a joint station at the city, being now concluded.

The only Contracts on which I apprehend any delay beyond the time originally fixed upon for their completion, are 1, 2, 7, and 11, in Yorkshire. The remainder will, I have little doubt, be executed within the time limited by the terms of the Contract; and I see nothing to prevent the whole of the line between Darlington and York being opened for the use of the public by the autumn of 1840, the period fixed for the completion of the other lines south of York.

Miles. Chains.

The whole length let is 32 46

And there remain to be let 11 58

to bring into operation the whole length south from Darlington.

(Signed)

T. STOREY, *Engineer.*

SCIENTIFIC AND MISCELLANEOUS INTELLIGENCE.

British Association.—It has been officially announced to the members of the association, that their next meeting will be held at Birmingham, in the week commencing Aug. 26th.

Locomotives on Common Roads.—A Frenchman of the name of Dietz,

says he is in possession of a locomotive that will work on the common roads.

Pneumatic Railway.—We were induced the other day to accompany a friend to see the operations of Clegg's machine for running on railways or common roads, by the aid of atmospheric pressure, at Samuda's, near Southwark bridge. The description in our No. 48 is a very faithful one. All the difference we could perceive between it and Pinkus's, is the fastening down of the band on one side, on which, we understand, the inventor lays great stress. The band is kept by the grease and pressure very tight, and free from leakage, and the piston, which is a cone with the point forwards, also smeared over with grease, performs well. It required an exhaustion of 27 inches of mercury to draw my friend and self, both light men, with the carriage and weights, making, as we were informed, 18 cwt. in all, up the incline 180 feet long, rising, it was said, 176 feet per mile, in 17 seconds, or at a rate a little more than 7 miles an hour, including getting up velocity and all. The area of the piston, we were informed, was about 10 square inches, so that the effective pressure must have been about $27 \times 5 = 135$ lbs. Probably this force was about 11 times what it would take to draw the same weight at the same rate on a level with a good carriage. But it is not easy to say what velocity could be acquired by this weight on a level, with the same apparatus, which will depend on the powers of the pump to keep up the exhaustion.

The exhaustion is carried on through a tube communicating with the main tube near its upper extremity; but we are uninformed of the dimensions of the air-pump.

In order to show the mode in which the change is made from one main tube to another, a valve opening outwards is placed at the end of the tube, with a weak spring on the outside, to press it against the end before exhaustion commences. This valve is struck open by the point of the piston which then comes out, and, at about a yard off, enters the next tube.

We must admit that the experiment we witnessed succeeded, as far as it went, very well, and exceeds anything like a mere model. Still, however, it is far short of what must occur if it be ever brought into practical operation. Nor is it even, on the scale on which it is tried, perfectly demonstrative of the practical utility of the invention. An exhaustion may be made very good upon a tube 100 or 200 feet long and $3\frac{1}{2}$ inches diameter, yet it might fail if it comes to be tried in a tube of much larger bore, and a couple of miles or more long, without, at least, a fearful expense. Again, for the experiment to be complete on the present scale, there should be another tube and a pump in like manner applied to it; so that one might see how the exhaustion would be commanded when the piston runs at a great velocity into a tube filled; as we presume it must be, with air. We think, too, that what might be quite successful at 7 or 8 miles an hour, might not be so at 30 or 40; the gentle taps of the one are not to be compared with the destructive knocks of the other.

We have likewise some misgivings of how the piston would stand a friction of 30 or 40 miles an hour in such a tube, for an hour or two. It cannot, of course, we suppose, be compared with the workings of our present pistons, about 5 miles an hour. Nor did we perceive any provision to prevent the rough rubs it must experience against the surface of the tube from every lurch and jerk of the train.

Another most important consideration also in this matter—supposing all other things go on prosperously—is, the commercial one, namely, that of expense. We will presume that the leathern belt can be kept perfectly sound and uninfluenced by the weather, and the great wear occasioned by

the rapid motion of the piston arm—which some very much fear the consequences of—yet the expense of laying down the main tube; keeping it in accurate order from the rude shocks it must receive; the countless fixed engines with all their concomitants, rearing their smoky heads at every two miles, and constantly kept going, are no dwarfs to set against the locomotives and the extra expenses of cuttings and embankments. We have never entered into the calculation, but we confess it looks to us as if it would come out with no mean figures. On this subject Messrs. Samuda seem perfectly sanguine, and calculate on a large saving; we can only say we shall be very happy to see it realized. At all events, if it be found to be successful, and no more expensive than our present plan when tried on a proper scale, there will be no comparison between the comfort of travelling in this way and with the ceaseless noise and nuisance of locomotives as now constructed.

We believe there was some intention of trying it on the Greenwich Railway. If carried out the whole length, this would be a pretty decisive test; but the treaty is off.

Rotary Engine.—M. Galy — Cazalat promises to lay before the Academy of Sciences a rotary steam-engine he has invented, which shall act by pressure, and yet have neither pistons, stop-cocks, valves, or teeth (engrenages).

Waterproof Cloths.—M. Menotti has submitted to the Academy a new process for rendering stuffs of all kinds—whether made up or not—impenetrable to water, yet perviable to air. It is sufficient to soak it in an inexpensive solution of particular soap, to wring it lightly, and then to let it dry horizontally in the open air. Is not this the same or a similar process to that of the British Waterproofing Company advertised in our journal?

Unsalting the Sea.—The ancients said, if sea water passed through the sides of a ball of wax, it would reach the centre perfectly sweet. When navigators wanted water, they used to boil sea water in brass or copper vessels, and suspend a large sponge over them, so as to receive all the vapour, which afterwards expressed would be perfectly sweet.

INSTITUTION OF CIVIL ENGINEERS.—June 1st, James Walker, Esq., the president, held a *conversazione*, which was crowded by noblemen and some of the most distinguished individuals of the day. Upon a moderate computation there could not be less, from first to last, we should think, than 400 guests. Numerous models of works of engineering (some of them by the distinguished president himself) and of art were distributed in the different rooms, for the amusement and edification of the visitors: while the elegant and hospitable entertainment provided by the president, afforded other opportunities of a still more social and mixed communication. The president was assisted in his no trifling task of attending to so large a party, by Thos. Webster and Charles Manby, Esquires, the secretaries of the institution; and we believe there was not an individual who did not depart highly gratified with the kind and affable attentions he received.

Archimedes Steamer.—A lamentable and fatal accident happened on board this vessel, May 30th, whilst waiting at the entrance of the East India Dock, previous to an experimental trip down the river. The accident seems to have been occasioned entirely by the injudicious overloading of the valves by the men, and has no connexion whatever with the invention, nor can we find there was any fault in the boiler. From the weight laid obliquely on one of the valves, it appears that it became jammed, and a large rent took place near the steam-chest, by which one of the engineers was so scalded that he died, and two others were injured.

REVIEW OF BOOKS.

The Engineer's Common-Place Book, by William Templeton, author of the *Millwright and Engineer's Pocket Companion*. Simpkin and Marshall. —The profession will feel indebted to Mr. Templeton for having added to our stock of information by a series of new and useful rules, the result of his own practical experience. We can recommend this little book as a very useful and well got up manual, which will be found particularly serviceable to the younger branches of the profession.

London, Southampton, and Portsmouth Railway Guide; with a Guide to the Environs of Southampton, the Isles of Wight, Jersey, Guernsey, and Alderney, and the opposite coast of France—London, Wyld, 1839.—This little book appears to be executed with care. It gives a description of nearly every village in Hampshire and in North Surrey, and full guides to Winchester, Southampton, Portsmouth, the Isle of Wight, &c. It is accompanied with a full map of the line, and maps of Portsmouth, Southampton, the Isle of Wight, and the opposite coast of France. In the introduction is an interesting and able account of the progress of a railway, with numerous wood engravings of its several parts. The work is got up very completely, and is interspersed with some amusing anecdotes, and we can recommend it for its cheapness, extent, and utility.

The Lecturer, Part 1st—London, Berger, 1839.—This promises to be a sound and useful publication, and, for the small price of sixpence, gives above thirty wood engravings, and Lectures on Photography, by Mr. Hyde Clarke; four on Geology, by Mr. Richardson of the British Museum; on Astronomy by Mr. Wyld, &c.

London and Birmingham Railway Hand-book for Travellers—Groombridge, London; and Wrighton and Webb, Birmingham.—This will be found a handy little work for travellers on this line; it is neither too diffuse, nor too concise, and the wood engravings, 25 in number, and map of the line, are neatly executed.

RAILWAY NOTICES AND STEAM NAVIGATION, &c.

Altona and Lubeck Railway.—June 3d, at a general meeting of the shareholders, William Ormsby Gore, Esq., M.P., in the chair, it was resolved to wind up the affairs of the concern, in consequence of not having the concurrence of the King of Denmark to proceed, which was necessary.

American Railroad across the Florida Peninsula, from Brunswick, Georgia, to the Gulf on the other side.—The engineer reports that no less than 120 miles is a dead level track, and the rest of easy curves. General Hamilton, the substantial friend of every useful enterprise, is engaged as one of the commissioners to effect a loan. A branch is to connect it with Columbus. Much of the commerce of New Orleans, and all that region, destined to the north, will eventually take this route, to escape the danger of the Florida and Bahama reefs. Brunswick, if it has the harbour reputed, may be another great emporium.—*Liverpool Standard*.

Brandling Junction Line Extended.—Arrangements, we understand, are in progress which will enable the inhabitants of this district to avail themselves of the facilities afforded by the opening of the Brandling Junction Railway in their communications with Durham, Stockton, Hartlepool, Darlington, and other places in their neighbourhoods. This benefit will be secured by regulating the times of arrival and departure of the Brandling trains at Sunderland, according to the times of departure and arrival on

the railway from Sunderland to Durham, which joins the Clarence Railway, and also the railway between Stockton and Darlington. The fares upon these lines are at present, from Sunderland to Darlington, first class trains, 7s. 6d., second, 5s.; to Dinsdale, first class, 7s., second, 4s. 9d.; to Whitby, first class, 7s. 6d., second, 6s. 6d.; to Hartlepool, 2s. If to these sums respectively be added, the steam-boat fare from this town to South Shields, and the fare from South Shields to Sunderland, together eighteenpence in the first class trains, and fifteenpence in the second, we shall obtain the fare from Newcastle to each of the towns above mentioned. During the first two days on which the Brandling Junction Railway has been opened to the public between South Shields and Sunderland, nearly 600 persons have travelled along the line. The original estimate was formed on 164 passengers daily, so that there can be no doubt whatever of its ultimately proving a successful and profitable undertaking.—*Newcastle Journal*.

Birmingham Railway.—We are glad to hear that this company have increased the speed of their trains. The journey of 112½ miles, not 116½ as the "Railway Times" has it, is now to be performed in 5 hours, including stoppages. June 14th, a special meeting was held respecting a plan for the new shares, G. C. Glyn, Esq. in the chair. The plan was, to propose that 31,250 new shares be issued, of 32l. each, making one million; each proprietor of one 100l. share, or of four quarter shares, to be entitled to one new share. Proprietors holding less than four new shares to have a certain compensation in money. It was suggested by Mr. Foster that holders of less than four quarter shares might unite and take their proportion of new shares, instead of receiving money; to which the chairman replied that the directors would be thankful for any suggestions, and give them their best attention. Mr. Tooke suggested that loan notes should be received as cash. It was observed by the chairman that probably the 32l. would be called for, 8l. the 8th of July; 4l. in August; a third sum in October; and the rest in 1840; that the whole of the 32l. would certainly be wanted, and that the dividends be made on the sums actually paid. During the business the chairman and Mr. Joseph Pease, sen., made some strong animadversions on the conduct the company had experienced from the Committee on the Bill.

Brighton Railway.—Brighton, May 28th, a jury was impanelled to assess the value of some land required by the company. The first piece belonged to Mr. Mighell, and was about 1½ acre, for which he required 900l. The jury being of opinion the land should be considered as building land, awarded 700l. for it.

The ceremony of laying, with masonic honours, the first stone of the viaduct over the New England road, near the terminus of the railway, took place on Monday. Among the company were many ladies of rank and fashion. Not less than from 10,000 to 15,000 persons, it is calculated, were gratified spectators of the interesting ceremony.—*Brighton Gazette*.

Bristol and Exeter Railway.—This company have determined to lay a single way only to Taunton in the first instance. But we believe and hope the directors will find it difficult to accommodate the traffic long on a single line.

The following is the resolution of the Board relative to allowing interest, which has been sent round to the proprietary, by the Secretary, John Badham, Esq.—"Resolved unanimously—That interest be allowed at the rate of four per cent. per annum, payable half-yearly from the 6th of April last, on all shares upon which 25l. per share have been duly paid, or hereafter shall be paid, and upon all future calls; such interest to be calculated from the day on which the last call completing the said amount of 25l.

per share, has been or shall be paid; and in like manner with respect to future calls. It being understood, that although the interest be accruing from and after the payment of 25*l.* per share, it shall not be receivable on any shares in respect of which any subsequent call remains unpaid."

In the Bristol papers have appeared some very able letters on the subject of allowing interest on calls, since our article in No. 39 appeared, and we are glad to find that the views we mooted on this subject have been, throughout the country, so well received. That it will become general we have no doubt.

"TO THE EDITOR OF THE RAILWAY MAGAZINE, &c.—Sir,—I have read with some surprise a statement in the 'Railway Times' leader of the 22*d*, that it is proposed to lay the single way to Taunton in the centre of the road. I beg to assure your readers it is no such thing, as you will perceive by the 'Bristol Mercury' of the same date. CAUTION."

Birmingham, Bristol, and Thames Junction Railway.—A special meeting of this company, as advertised in our last, was held in the company's offices, Adelphi, June 5*th*, for the purpose of enabling the directors to raise the sum they are entitled to by their Act on loan; Henry Luard, Esq. in the chair. After a good deal of discussion it was resolved to empower them to borrow any sum not exceeding 50,000*l.* In the course of the discussion it appeared that the arrears amounted to 25,633*l.* The liabilities of the company, as stated by John Thompson, Esq. the secretary, were, for land, about 41,613*l.*; for works under contract, to finish the line, 30,191*l.*; cost of laying the permanent way, 14,500*l.*; and of stations, carriages, &c., 12,500*l.*; other liabilities, about 4,500*l.*; in all, 103,300*l.* The assets were, arrears, 25,000*l.*; call coming due, 10,278*l.*; surplus property, 38,000*l.*; leaving a deficiency of about 30,000*l.* The chairman said the total cost would exceed the Parliamentary estimate by only 4,000*l.*, an announcement which gave great satisfaction; and the engineer, W. Hosking, Esq., stated, that he thought the line would be opened by Michaelmas. During the meeting Mr. Garland thought that if interest had been allowed on calls, the arrears would not have been so large. An opinion in which others concurred. The following account of the works is from a correspondent:—"The Thames Junction Railway Company are now pushing their works with vigour and activity; they have a great number of men constantly employed on the works, which are very heavy in some portions. They are progressing rapidly with the works in the neighbourhood of the tunnel under the canal, the entrance to which tunnel they have completed some time since. The work is strong and substantial, but plain to a degree amounting almost to ugliness. I think they might have displayed a little more taste here, especially as the iron bridge which they have thrown across the new cut for the canal is of rather a neat and novel construction. Four semi-circular cast iron spandril arches are thrown over each side, from which the suspending wires of the platform hang. The two arches are fastened together at the crown of each span by a transverse bar of iron. The appearance of the bridge is strong, and at the same time light and airy; it is now ready for receiving the materials for forming the roadway on it, all the planking being already laid down. On the north side of the canal they have a very heavy cutting to go through, a good deal of which has yet to be done; they, however, are proceeding with activity, and all the clay removed from the cutting fortunately has not to be carried to any great length, it being used in the construction of a heavy embankment on the north side of the canal leading to Wood-lane. They have entered the fields here, joining the scrubs for a considerable distance with the embankment. At the back of Kensington-

crescent, immediately adjoining the canal basin, they have not been able to push on so rapidly as might be wished; they are very much troubled with water here, but there is not the slightest danger to be apprehended to the works ultimately, and it will not be long before this matter is completely mastered; they will then drive on without anything material to oppose them. They have had a portable steam-engine pumping here for some time, but now they have resumed pumping by hand, the water not gaining so fast on them.

Birmingham and Derby Junction Railway.—The directors lately inspected the whole of this line, and though it is not completely finished, and no day fixed, no doubt exists of its being opened the entire way, 38 miles, between Derby and its junction with the Birmingham, some time in July.

Bolton and Preston Railway.—We understand that five or six miles of this line of railway are nearly completed at the Bolton end, and that a vast number of men are thereon employed, hands being unusually plentiful. In about three weeks the remaining portion to the meeting with the North Junction will be let. Surveyors and others have been passing over and measuring the line daily for several weeks past, particularly near Chorley, where there will be seen some cutting and tunneling.—*Preston Observer.*

Cheltenham and Great Western Union Railway.—The works are proceeding rapidly on that portion of the line between Cheltenham and Gloucester, along the whole of which the works are in a very advanced state. The directors, in answer to a deputation of gentlemen, requesting that the station of the company in that town may be placed in Jessop's garden, St. James's-square, rather than where at present contemplated, in juxtaposition with that of the Gloucester and Birmingham Company, at the end of the Lansdowne road, intimated that they would most readily enter into the views of the requisitionists, provided Mr. Skillicorne's consent to pass through his land could be obtained, and the sum of 15,000*l.* could be raised in the town, in shares of 10*l.* or 15*l.* each, towards defraying the additional expense which would be incurred by bringing the depot to the locality suggested.—*Bristol Journal.*

Chester and Holyhead Railway.—Alluding to Stephenson's extraordinary plan of taking the trains over the Menai singly, by horse power, a correspondent asks us, "Why not adopt the late Mr. Rennie's plan and build a cast iron bridge of three arches, on the Swilly rocks, above the present, where the rocks form excellent foundations for the piers?" We believe Mr. Stephenson has since determined to pass the Menai by a wooden bridge. This is a more sensible plan.

The following is an extract from a letter we have just seen—"The great Holyhead Railway has died a natural death." No doubt the Ormshead line will now be carried, if the parties have any spirit, as it will only cost, including 150,000*l.* for the pier and breakwater, 600,000*l.*

Curious Parliamentary Consistency.—If Parliament be dissolved while any private Bill is passing, we are informed the Bill is taken up in the new Parliament at the point it left off in the old; but if the Parliament is prorogued during the progress of a Bill it is lost, and must begin, *de novo*, in the next session, though it be the same Parliament. If this be so, can any one tell us the common sense of this?

Eastern Counties Railway—Fatal Accident.—An accident occurred on this line on the 21st instant, which has been much magnified in the daily papers. The facts of the case are these: the Romford train left Devonshire-street at a quarter before 5 o'clock in the afternoon, under the care of John Meadows, an experienced and steady engineer. The train had reached Stent's Mill Bridge, about half a mile from Stratford, at which

place there is a curve of about a mile and a quarter radius on a gradient falling about 16 feet per mile. Instead of shutting off the steam at this point, the engine, which was then travelling at a very high velocity, was allowed to run with its full power, and thereby acquired such immense speed that it rocked violently from side to side, and finally ran off the rails at the curve. Such was the immense velocity that a long strip from the flange of the rails, half an inch in thickness was cut completely out by the wheel of the engine. The engine-man had previously been warned not to drive so fast; and in this he disobeyed the express and repeated orders both of the chief engineer of the company, and also of the manager. Both the engine-man and the stoker were killed on the spot, but neither the passengers nor the guards were in the least injured, nor were the carriages thrown off the rails, the engine having detached itself from the train. At the coroner's inquest a verdict of accidental death was returned on both the bodies, it appearing from the evidence that the unfortunate accident was clearly attributable to the fault of the deceased persons themselves. Even the break had not been applied to the wheels by the stoker; and it was considered by some of the persons who saw the accident, that at the moment at which it occurred, the velocity could not have been much less than 70 or 80 miles an hour. There is no truth whatever in the report that the accident occurred owing to the settlement of the embankment, or to the rising of a rail. That part of the embankment where the accident occurred has been made many months, and both it and the rails are in the finest possible condition. It is not true, either, that the boiler of the engine burst: the only injury the engine has sustained arises from the violent concussion having slightly strained the frame, and one of the wheels is also somewhat injured.

Was not this the same engine-man who was discharged from the Southampton Company for furious driving, contrary to the express orders of Mr. Reed, the secretary?

Edinburgh, Leith, and Newhaven Railway.—The amended Bill, with several important and useful clauses, only awaits the Royal assent, having passed the House of Lords on the 20th of June. By the alterations in the levels, this company will save upwards of 36,000*l.*, under the able management of Mr. Macneill, and of Mr. Gibbs, the contractor. This railway, and the Trinity Harbour will now be completed, which will be of the greatest possible advantage to all the Scotch railways, as the intercourse with the Frith of Forth will advance the traffic on all the projected railway communications throughout Scotland, and tend to revive the commercial prosperity of that portion of the British Empire.—*Liverpool Standard.*

Grand Caledonian and West Cumberland Railway.—We are informed by the "Preston Pilot," that this undertaking is to be brought out again, but whether under the late unsuccessful pilots we are not informed. The mishap of the imprudent attempt to bring it before the public last spring was prophesied by all men of common sense long ago. We wonder why, instead of being let out to nurse by the year as it has hitherto been, it is not restored to Mr. Hyde Clarke and its original promoters.

Great Western Railway.—The traffic on this line, during the Ascot Heath races, was unusually great. On the golden cup day, May 30th, there were carried 7,559 persons, and the receipts were 1,393*l.* 8*s.*; and for the week 23,519 passengers, and receipts 4,087*l.* 12*s.* 2*d.* In one instance no less than 675 passengers, besides two stage-coaches and three horses, were carried in one train. In another the celebrated "North Star" engine took 617 passengers, nine coaches, and fifteen horses, to Maidenhead, in less than one hour. In a third instance, 657 persons, five coaches, and

fourteen horses were carried by one train. Some of these trains could not be less in the gross than 250 tons, or more. The above our readers may depend on. The accounts given in the "Railway Times" are grossly incorrect. The further portion of nine miles from Maidenhead to Twyford will be opened on the 1st of July. [See p. 439.]

Great Western Steam-ship.—A beautiful painting of this fine vessel 4½ feet by 3 feet, has been lately finished by Mr. J. Walton, of Bristol, and purchased by the company. It is, we believe, intended to take an engraving of it.

Glasgow, Paisley, and Greenock Railway.—We are glad to hear that all parties of this line are harmoniously combined to keep faith with the public, and to open it in June next. About 3,000 men are now spread over twenty-two miles, and the whole is proceeding rapidly and prosperously.

Greenwich Railway.—The half-year's receipts from Dec. 24th last, to June 23d, inclusive, are 28,464*l.* 13*s.* 2*d.*, or at the rate of upwards of 56,929*l.* 6*s.* 4*d.* per annum, because one day's receipts, the 24th, are deficient. The Croydon line is already paying them for tolls above 125*l.* per week, or at the rate of 6,500*l.* per annum. The Greenwich Company's receipts, therefore, exceed 63,400*l.* annually. If the expenses, as it has been stated, do not exceed 20,000*l.* or 22,000*l.* per annum, the shareholders will be in a fair way of receiving 6 per cent. already. Having so flourishing an income, we shall be glad to see the directors improve their line, and get rid of the noise by getting rid of the parapet walls.

Grand Junction Railway.—The rates for the carriage of merchandise on this railway were reduced on the 1st instant. The principal reductions are on goods which were formerly charged 1*s.* 6*d.* and 1*s.* 3*d.* per cwt.; the former charge having been reduced to 1*s.* 3*d.* and the latter to 1*s.* 1½*d.* per cwt. The company are now carrying throughout between Liverpool, Manchester, and London.—*Mining Journal.*

Whenever this company makes their appearance in Parliament again, we understand their wings will be clipped a little, to avoid which it is supposed they will remain as they are.

Great North of England Railway.—The last contract, or section, to complete this railway from Darlington to York, is let. The directors of this company have given the contractors every encouragement to push forward their contracts with vigour. The junction of the contract No. 6, from the north, with that of No. 7, near the Castle Hills, Northallerton, will soon take place.—*Doncaster Chronicle.*

Glasgow and Ayrshire Railway.—[Compensation cases decided by arbitration]:—John Taylor Gordon, Esq., claimed 3,000*l.* for land and damages on his property of Newton Lodge: the arbiter awarded 500*l.* For a similar case 500*l.* was claimed, and 55*l.* awarded.—*Ayr Advertiser.*

Glasgow, Paisley, and Greenock Railway.—[Compensation case]:—On the 3d of June, a Sheriff's Court was held in Paisley, to assess compensation and damages for land belonging to the Corporation of Paisley, in the Volunteer Park, and park north of it, which had been laid out for leasing. The company had offered 1,660*l.*; the jury assessed the value of the land and damages at 1,660*l.*—*Abridged from "The Glasgow Courier."*

Hull and Selby Railway.—The paragraph inserted in our last number relative to this railway, stating that the full amount required to be taken up on loan was subscribed, the secretary of the company has informed us, is incorrect. [It came to us from one connected with the company.] We learn that nearly two-thirds of the sum have been received already, without advertising for it, and every prospect of the remainder being obtained before it is required. The various works were urged on

with renewed vigour as soon as the season allowed of it, and on the greater portion of the line men are employed both night and day. The following brief statement will show that very great progress has been made on all the contracts. The buildings at the Hull terminus are in course of erection. The warehouse for goods will soon be ready for the roof, and the foundations for the offices and the passengers' shed are all laid. The embankment on the foreshore of the Humber, near Hull, for above half a mile in length, is completed ready for receiving the ballast; and considerable progress has been made in the remaining half mile of this embankment. The formation of the railway on the Hessele contract (seven miles in length) is completed, with the exception of two short lengths at the Ferryby, and Hessele deep cuttings, and the ballasting has been already commenced. The Brough contract (six miles in length) is nearly all formed, except about a quarter of a mile of cutting, only four feet in depth at the east-end, and about two miles are already ballasted. The Market Weighton Canal embankment ($1\frac{1}{2}$ mile long), with the exception of about 200 yards in length, is completely ready for the ballast, part of which is on the spot. The iron superstructure of the bridge over the canal is erected. The Howden contract (9 miles in length) is all formed, and about $3\frac{1}{2}$ miles of the way ballasted. The foundations of the bridge over the river Derwent are nearly ready for receiving the iron superstructure, which is already cast and fitted up at the foundry of Messrs. Thos. S. Pim and Co., in Hull. On the Selby contract (six miles in length) the works are rapidly proceeding; the principal part of the line is formed; the foundations of the bridge over the river Ouse at Selby were completed some time since, and the cast-iron piers, or standards, are now fixed, ready for the superstructure, the arrival of part of which is daily expected from the Butterley Iron Works, the remainder is all cast, or nearly so, and will be delivered at Selby by the time the other part is fixed. A considerable number of cross sleepers are received, and as the iron tanks are nearly completed, the process of Kyanizing will be commenced very shortly; immediately afterwards one line of the permanent way will be laid down, whilst the temporary way is being used for finishing the forming and ballasting. The station-houses on the line are about being contracted for, which are the last works of much importance remaining to be let. The first and second class passenger-carriages are in a very advanced state of forwardness, as are some of the locomotive engines, one of which is quite completed. About 1,100 men, and 140 horses are employed upon the various works; and this line, when completed, will, for a considerable portion of its length, embrace scenery of the most beautiful description, having the river on one hand occasionally presenting the appearance of a lake, and on the other a fertile agricultural district, with the Yorkshire Wold Hills at a short distance. For a continuous length of about eighteen miles, the line is straight, and by a reference to Bradshaw's Railway Map, it will be seen that it is the most level line in the kingdom for its length, which, from Hull to the junction with the Leeds and Selby Railway at Selby is nearly thirty-one miles. The works on the line are visited at regular intervals by a deputation of the directors, especially appointed to that service, in order to ascertain from personal inspection the progress which is made.

Imperial Railway from Newcastle to Edinburgh.—At the annual meeting of the commissioners of supply and heritors of Roxburghshire, held June 4, in Jedburgh (the Marquis of Lothian in the chair), a resolution, in favour of the above intended line, was passed, and rescinding the resolution adopted at a former meeting to memorialize the Treasury for the appointment of a neutral surveyor. A provisional committee was appointed to co-operate with "the

opulent and influential individuals of Newcastle and its neighbourhood," and also with the promoters of the undertaking at Edinburgh and elsewhere.—*Gateshead Observer*.

Irish Railways.—We are happy to announce that Lord Morpeth declared in the House, on the 25th inst., the determination of the Government to leave the construction of railways in Ireland to private enterprise. This is as it ought to be, and as we have always advocated. We cordially congratulate the Government and the Irish railways on so judicious a determination. Now will be their time for exertion. We hope, ere long, to see that valuable undertaking, the Kilkenny line, in the flourishing position it ought to be, and which it must have been, had it not been so injured by the Irish Railway report, and the consequent steps of the Government. It behoves the proprietors now to be active, and not to let so valuable an undertaking drop through their hands. The question of the Government being ended, we now beg to say that our course was taken most conscientiously and cordially for the welfare of Ireland; that we have never had a single other object in view; and we are perfectly satisfied that had the Government measure been adopted, it would have been one of the most disastrous for Ireland that could have been contrived.

Lancaster and Preston Junction Railway.—On the 19th, the annual general meeting of the shareholders of this line was held in the Town Hall, Lancaster, which was numerously attended; George Burrow, Esq., chairman of the board of directors, took the chair. Mr. S. E. Bolden, clerk to the company, read the report, which stated that the land required for the railway and stations had been contracted for, and is now in possession of the company. That 1,500*l.* had been paid to George Jackson, Esq., as compensation and damage caused to his mansion and grounds at Barton. That 50*l.* was contributed towards the survey for continuing the line north of Lancaster. That 62,800*l.* has been received on mortgage of the 83,000*l.* authorised to be raised at 5 per cent. for three years, and that a very small amount of arrears are due on the calls, which amount to 30*l.* per share. From the engineer's (Mr. Locke's) report, it appears the works are progressing satisfactorily, with one exception, that of the Lancaster contract; Mr. Perry, the controller, not having provided sufficient materials for the men to proceed with the works, the directors were obliged to take it into their own hands. More than two-thirds of the entire number of bridges are in various states of forwardness, and nearly one-half of the whole quantity of excavation is removed. There is no embankment requiring more than 70,000 yards at one end, and from this and other circumstances, the engineer is confident that the line may be opened to the public in June, 1840.—*Lancaster Paper*.

Llanelli Railway.—The general meeting took place June 3d, at the London Tavern; Robert Biddulph, Esq., in the chair. The report, in another part of our journal, having been read by John Bigg, Esq., the secretary, the chairman observed he was ready to answer any questions that might be put to him, whereupon a gentleman observed that he thought the report so satisfactory that none were needed. To a question of John Shewell, Esq., the chairman answered that it was not intended that those who had lately entered the concern should be on a par with the original shareholders. It was the intention of the directors to propose that a dividend be declared at a per centage on the sums paid up. In reply to other questions, he said, the directors did not intend, as they did not want at present to borrow money; and that having purchased and paid for nearly all the land, he had no doubt the line could be finished within the estimates. In consequence of the very satisfactory manner in

which the resident superintendent, Mr. Biddulph, and the secretary, Mr. Bigg, perform their arduous duties (the latter gentleman, Mr. Blount said, in addition to his usual duties, draws all the contracts, and had saved the company large sums in keeping down the law charges), some of the shareholders were anxious to know whether they were satisfied with their remunerations. Mr. Bigg answered for himself that he was, and the same was answered for Mr. Biddulph, not present. The report having been received and adopted, David Lewis, Esq., proposed, and the Hon. Captain Hotham seconded, that the available surplus mentioned in the report be divided among the proprietors, and paid on the 10th of July, which was carried unanimously. In the course of his observations, Mr. Lewis observed that this surplus was derived from the harbour, and only two miles of the railway. Sir Robert Price, Bart., M.P., was then elected a member of the committee of management, in lieu of R. G. Thomas, Esq., resigned. Wm. Blount, Esq., in a very able speech, setting forth the injustice of letting the public, who had contributed nothing to the prosperity of the concern, in at this time to an equal participation of its benefits, proposed that 480 unissued shares should be distributed among such of the proprietors as may choose to take them, and that instructions be given to the committee of management to that effect. The Hon. Gentleman observed that the funds of this company were found almost exclusively by gentlemen privately related, or personally known to each other, and that the public was, now that the prosperity of the concern was become so manifest, very anxious to join in it, which he hoped would not be allowed. So well had things been managed, that the actual cost would be 15,000*l.* less than the estimate. ("Hear, hear," echoed from every corner of the room.) If these shares were taken up, of which there was not the least doubt, there would not, he said? for the present be any need of making more calls. The Hon. Gentleman observed, that he had lately been over the line, and that there was not an inch of the country passed over which was not rich in mineral produce. In answer to a question about the stability of the works, he said most emphatically that they were not only well constructed, but he believed the Llanelly would be one of the best of railways ever constructed. Mr. Blount's motion, after some conversation about the issuing of the shares, was carried unanimously. Thanks were then severally and most cordially voted to the committee of management, John Biddulph, Esq., the superintendent, John Bigg, Esq., the secretary (on whom Mr. Blount passed a high eulogium, which was fully admitted by the meeting, and observed that he merited a far higher remuneration than the 300*l.* a-year he was receiving), and to the chairman for his conduct in the chair. The meeting, which was highly respectable and very large, broke up. In returning thanks, the chairman said that the 6½ miles mentioned in the report, were opened on the 1st of June.

Manchester and Birmingham Extension Railway.—This company closed their case in Committee, June 24th, after the Committee had sat nineteen days. The opposition will now have to open theirs, which they calculate on lasting three weeks. If so, the above company will probably be beaten by time.

Maryport and Carlisle Railway.—The works are proceeding rapidly; nearly eight miles between Maryport and Aspatria, are ready for laying the permanent way on this part of the line, which it is supposed will be finished in about two months. And great exertions are making to complete another portion of this line from Carlisle to Wigton.

Midland Counties Railway.—The following is the engineer's return of the quantity of earth-work executed, and the number of men, horses, and engines, employed on the works yet to be completed of the Midland

Counties Railway, from the 20th April to the 18th May, 1839:—Earth-work executed, 297,960 cubic yards; number of men, 5,138; number of horses, 513; engines, three locomotive and two stationary. The number of persons which passed between Derby and Nottingham, by the railway, on Tuesday, the first [public] day, amounted to 500. The multitude which assembled in the evening, at Derby, to witness the arrival and departure of the last train, was one of the largest assemblies which ever took place in this town. We have heard various estimates of the numbers, but it is pretty generally agreed that there were from ten to fifteen thousand persons present. Not the slightest cause of alarm happened during the day, and the greatest confidence generally exists in the safety of this mode of travelling.—*Derby Reporter*.

North Midland Railway.—(Derby Station.)—On the 13th June, Mr. Jackson, of London, contractor for the works on the line of the North Midland Railway from Bull Bridge to Belper, was declared the contractor for the station at Derby. The estimate is about 70,000*l.*; the works to be completed in six months.—*Sheffield Iris*.

From the rapidity with which the works are proceeding, there is every probability of 50 miles of this line, from Derby to Cudworth-bridge, near Barnsley, being opened by March or April next; that is about 3 months earlier than was expected.

Newcastle and Carlisle Railway.—We are glad to hear that the directors of this company are acting on the principle of low fares. It is the only true policy, we are sure, for railway companies to pursue if they wish for large profits. Nineteen out of twenty men will spend ten shillings in shillings at a time rather than half the sum at once.

Northern and Eastern Railway.—A special general meeting was held at the company's offices, Moorgate-street, June 3d, to submit drafts of the Bills, in compliance with the standing orders of the Lords, previous to their introduction to the House: H. G. Ward, Esq., M.P., in the chair. No. 1 was merely to extend the time for the purchase of land for the railway; No. 2 was principally to give effect to the arrangements with the Eastern Counties Company. One clause was, to reduce the number of directors from 18 to 12, and another to allow 5 instead of 4 per cent. interest on calls paid in advance. It is mentioned that Mr. Walker has resigned his situation of engineer to this company, and that Mr. Geo. Stephenson has succeeded him.

Railway Society.—The first general meeting of the members of this Society was held the 20th June. The object was merely to frame regulations for their management, and to report on what they had done. We understand the great and respectable railway gentlemen of the North look coldly on this Society, and keep aloof from it. Can any one inform us why?

Railway Investments.—A correspondent to the "Bristol Mercury" remarks, that "When the rational and judicious plan of allowing interest upon paid up calls was adopted by the directors, I immediately disposed of some other securities, and purchased more largely in the Bristol and Exeter Railway. My new shares, with 25*l.* paid up, cost me from 12*l.* to 14*l.* each; in this manner I invested 1,000*l.*, for which I was receiving about 35*l.* a-year, but which will now yield me more than 70*l.* a year, with a fair prospect of a dividend of at least 10 per cent. within the next two years, when my 1,000*l.* will bring me above 175*l.* a-year."

Report of the Select Committee on Turnpike Trusts.—This report has just made its appearance, with the evidence taken. It states that the present debts of the turnpike trusts exceeds 9,000,000*l.*, which are increas-

ing, from the practice of converting, in many places, unpaid interests into principal; that the loss from substituting compositions for statute labour, amounts to 200,000*l.* per annum. To lessen the difficulties, the report recommends the union of small trusts, within a radius of 15 miles, to restore statute labour, and to equalize more the duties between travelling on common roads and railways. On the Birmingham turnpike road alone, the tolls have decreased from 28,525*l.* in 1836, to 15,798*l.* in 1839, per annum, from the interference of the railway. In the evidence there is some amusing as well as interesting matter, but we have had as yet but little time to look into it. Sir James M'Adam says, many of the tolls have been seized by the creditors, and that the roads will have to be kept in repair by the parishes. Mr. Ogle's evidence on steam-coaches is truly rich. We think he must lately have been seized with an ambition to outrun Gulliver. He has "gone through the streets of London," he says, "with 20 millions of pounds weight (pressure?) *raging* to get loose." What a mad concern this must be!!

Sheffield and Rotherham Railway.—The number of passengers on this short but flourishing line, during a past week, amounted to nearly 20,000; and during the month of May to upwards of 50,000!—*Manchester Guardian.*

South-Western (Southampton) Railway.—The following are the receipts of this line for four weeks ending the 2d, 9th, 16th, and 23d of June, namely, 2,219*l.* 13*s.* 11½*d.*; 2,200*l.* 13*s.* 6½*d.*; 2,762*l.* 1*s.* 1½*d.*; and 2,964*l.* 11*s.* 7*d.* Though only the head and tail of this line are finished with 18 miles of body unfinished, they are taking more money than all their *proved* estimates before Parliament amounted to.

Subscription for the Family of the late Mr. James.—We understand that a general subscription is about to be commenced for the purpose of presenting to the family of the late William James, Esq., a testimonial commensurate with the great benefits conferred on the world in general, and on this nation in particular, by his projection and promotion of the railway system. We are sorry to learn that such a testimonial is much needed. It is but an act of justice towards the memory of one whose large property is stated to have been sacrificed to his unwearied exertions in the promotion of this and other great national improvements.—*Midland Counties Herald.*

Talacre Coal and Iron Company.—[In reply to a letter we wrote to Mr. Suter, a gentleman well known in the geological world, to have his opinion of the above fields of coal and iron, we received the following.—Ed. R. M.]

"Dear Sir,—In reply to your request of my *unbiased* opinion of the above property, because, as you state, I have seen it, allow me to observe, my visit was not only unsolicited, but arose from having seen and tried a sample of the coals about two months ago in Dublin, which I considered, in comparison with the best hitherto supplied to that market, as of so superior a quality as to confer a great public benefit, and will, no doubt, be in general request as soon as a regular delivery can be effected, several cargoes having given the utmost satisfaction. The works, I understand, are making so rapid a progress, that large deliveries will take place in less than a month, and from the well-ascertained stratification by shafts over the whole property of both coals and iron, the quantity on the spot appears to be so exhaustless as to render Mr. Bagnall's estimate in the prospectus a very moderate calculation. The iron is of great per centage and of undoubted quality for smelting, in addition to which, the sand or freestone, which may be seen in the adjoining quarries, and covers a considerable

portion of the estate, will no doubt turn out a valuable acquisition from the circumstance of the great facility in shipment when Sir Edward Mostyn's new harbour is completed, which he is carrying out entirely at his own expense. I could much enlarge on the advantageous situation of the property in all respects, was it not my earnest wish that all who are desirous of participating in the advantages should visit Talacre.

"I am, Sir, your obedient servant, EDWARD SUTER.

"Cathedral Hotel, St. Paul's Church-yard, London, 25th June, 1839.

"To the Editor of the Railway Magazine, &c."

Thames Tunnel.—The works are still progressing with comparative rapidity. It is believed from the appearance of the strata and the care taken to protect the works, that all danger has been surmounted. A shaft is to be sunk on the Wapping side as soon as the tunnel passes the line of low water mark, at which time the workmen will then continue their labours at both ends of the tunnel until they meet. It is expected that foot passengers will be able to pass through the tunnel in the autumn of 1840.

Versailles Railway.—The first essay of the Versailles Railway, on the right bank of the Seine, took place May 30; the locomotive proceeded directly from the Paris station to the Rue St. Symponien, in Versailles. The inhabitants of Ville d'Avray, Sevres, Chaville, Viroflay, and Mar-treuil, assembled in crowds along the road, to enjoy a spectacle so novel to them.—*Siècle.*

York and North Midland Railway.—The traffic on this line from the 30th of May, when it opened, to the 18th of June, 13 days, was 3,064 passengers, producing 368*l.*, and merchandise, 200*l.*; in all 568*l.* They are now carrying large quantities of coals, and the effect already has been to reduce the price in York from 14*s.* to 8*s.* per ton. The above traffic is on 14 miles of the road, costing only 120,000*l.*

Great Western Railway.—A special general meeting of this company was held on the 26th June, at their offices, Princes-street, London, which was numerously attended. The chair was taken precisely at 12 o'clock, by W. U. Sims, Esq., who clearly and briefly stated that the meeting was convened for the purpose of considering and determining the mode to be adopted for raising the additional capital authorized by an Act passed in the present session. A shareholder complained that the meeting was not sufficiently advertised, namely, twice in the Bristol and London papers, and once in each of the London morning papers. The chairman then directed the two clauses of the Act to be read which authorized the company to raise 1,250,000*l.* by creating new shares of 50*l.* each, transferable, and to be disposed of by the proprietors as other shares. The dividends payable on the new shares to be in proportion to their amount the same as on the old shares, and when half the capital on the new shares is paid up, the sum of 416,666*l.* may be raised on mortgage. A holder of less than two new shares cannot vote in respect of them. The chairman said, it was necessary for the meeting to give effect to the recent Act obtained 4th June, 1839, and also to sanction a resolution drawn up by the directors. Mr. Roskil proposed the following resolution, which was seconded by Dr. Lloyd, and carried unanimously, namely, "That in conformity with the provisions of the Act of 4th June, 1839, 25,000 half shares of 50*l.* each be created, and that every proprietor duly registered on Saturday, the 13th July next, shall be entitled to the option of taking the said half shares to a number equal to that of the whole shares then standing in his name on the books of the company, and in case the whole number of half shares be not so taken on or before the 27th July, the remainder shall be appro-

priated and disposed of in such manner and by such ways and means as the directors may consider best for the interests of the company." The chairman, after answering some questions in explanation of the resolution, then declared the business of the meeting to be concluded. A shareholder wished for permission to ask Mr. Brunel a question respecting the works, in answer to which he stated, that every part of the line was contracted for and in course of execution, with the exception of about half a mile in length. Nothing new had occurred to impede the works of the Box-tunnel, and that it was going on well. The chairman concluded the questions by saying, as the next half-yearly meeting would take place in Bristol on the 28th August next, Mr. Brunel would then be prepared to answer any question respecting the progress of the works. He was glad to inform the meeting that the line would be opened as far as Twyford on the 1st of July. Captain Porter proposed that the thanks of the meeting be given to the chairman and directors for their exertions in obtaining the Bill, which was seconded and carried unanimously. The meeting then separated. Great harmony prevailed at this meeting, and the business of the day was quickly disposed of.

Birmingham and Gloucester Railway.—We understand that nearly the whole of the works are under contract and going on well.

LAW CASES.—The only cases involving any points of interest which have occurred this month, are the following:—

The Queen v. the Commercial Blackwall Railway.—[Bail Court, May 29th.]—An application was made by Mr. Maxwell for a writ of mandamus to issue, calling upon the defendants to purchase certain property in the neighbourhood of Aldgate, belonging to Mr. Wilson, which had been injured by the construction of their railway, or to have the value of the property assessed by a jury. Writ granted.

The Queen v. the Eastern Counties Railway.—*Mandamus.*—The case of an application for a mandamus to compel this Company to carry on their line to Norwich and Yarmouth, was argued in the Queen's Bench on the 10th of June. Several affidavits were put in, tending to show that the Legislature granted the Act for the purpose of carrying the line throughout; that it would be a fraud on the Legislature, and a great injury to the counties of Suffolk and Norfolk, if it was not. On the contrary, Mr. Bosanquet, the chairman's affidavit went to prove that the directors were acting the best for the interests of all parties, and with the perfect concurrence of the proprietors, in the course they were taking; that the plaintiffs did not hold but 138 shares out of 64,000; that the Company's capital, it was now found, would not make the whole line; and that if they were compelled to proceed to Norwich and Yarmouth, the effect would be to embarrass and stop the works they were now about. Mr. Braithwaite, the engineer's affidavit merely went to disprove a point sworn to by Mr. J. C. Cobbold. After hearing counsel on both sides, the court said it would take time to consider its judgment. It is highly complimentary to us to see that so profound a lawyer as Sir Frederick Pollock took precisely the same view of the subject we did in our last, and used almost the same terms.

June 21st. The court said that, looking at the whole case, but without giving an opinion, there appeared sufficient doubt to require a return to the mandamus; and the rule must go for that purpose. Rule made absolute.

Really our laws are wonderfully mysterious. Lord Eldon said, that if a company had not sufficient capital for their object, any partner might file an injunction against them, and stop them until they had authority to raise a sufficient. Lord Denman's, if ultimately carried, decides, in effect, that

if their capital is not enough, they must nevertheless go on. We should like to know how.

Parkin v. Croydon Railway Company.—June 12th. This was an application in person, by plaintiff, to Lord Langdale, to restrain the defendants from proceeding against him, as in case of nonsuit, respecting an action he had brought against them for a supposed infringement of his patent, on the ground that he had been ignorant of a clause in their Act requiring him to give 20 days' previous notice of action. Lord Langdale refused the application, on the ground that the defendants must not be deprived of the right they had on account of plaintiff's ignorance.

Lord Howden v. Sir J. Simpson, Knt., and Others.—[Exchequer Chamber, June 18th. Before the Judges. In Error. Important Case]:—The defendants in this case are directors and proprietors of the York and North Midland Railway Company, and the Noble plaintiff is one of the landholders through whose property the original line of the road was intended to pass. As that line was laid so close to his mansion as to destroy all the privacy and personal comfort of his residence, he commenced an opposition to the passing of the Bill, and a negotiation was afterwards commenced, which resulted in an agreement, that if the Noble plaintiff would withdraw his opposition to the Bill, and the Bill should pass into a law, the defendants would, six months after the passing of the Act, pay 5,000*l.* on account of the injury the Noble plaintiff would sustain under that Act, but which sum was to be the full compensation for the injury his Lordship would sustain in case a deviated line, particularly specified, or any other line should be substituted, and for which specified deviation line, the defendants agreed to apply for an amended Act in the following session of Parliament. The Act for the first contemplated line was obtained, and six months afterwards, when no other Act had been applied for, payment of the 5,000*l.* was demanded and refused, when the Noble plaintiff brought his action on the ground that the same was, at all events, then payable, whichever Act might be ultimately adopted. The defendants in breach of their agreement, never applied for the specified deviation line, but after the action had been commenced, obtained an amended Act for another deviated line, which did not pass through, but within a few yards of Lord Howden's lands, and therefore contended that they were exonerated from the obligation of paying the 5,000*l.*, as the line now adopted did not actually touch the Noble plaintiff's land. His Lordship having proceeded to sue the defendants at law upon the agreement, they applied to the Master of the Rolls for an injunction to restrain the action, on the ground of the illegality of the contract, and Lord Langdale adopted this view of the case. Upon appealing from that decision to the present Lord Chancellor, his Lordship expressed his opinion that there was nothing unlawful in the general nature or particular circumstances of the bargain, and he therefore allowed the action to proceed. The defendants in the action pleaded, first, that the agreement was void, upon the ground that the plaintiff, being a member of the Legislature, could not lawfully enter into an engagement which might have the effect of placing his own interest in opposition to that of the public. They pleaded, secondly, that the agreement was a fraud upon the other landholders upon the line, from whom it was concealed; and that it was a fraud upon the Legislature, to whom it was not communicated. The plaintiff *demurred* to the pleas, and upon the *demurrer* judgment was given for the defendants.

Mr. Creswell now appeared in support of the appeal, and contended that the judgment of the court below was erroneous, on the ground that such agreements as the present had been holden in many preceding cases

by Lord Eldon and other eminent judges, to be perfectly legal, and that concealment of the agreement from the landholders and from Parliament, was a matter which could not in any degree affect the nature of the agreement itself.

Mr. Addison, in the absence of Sir F. Pollock, appeared in support of the judgment of the Queen's Bench.

The court took time to consider the case.

Northam-bridge and Roads Company v. Southampton Railway Company.—[Vice-Chancellor's Court, Saturday, June 22]:—His Honour delivered judgment this morning upon the motion for an injunction to restrain the company from carrying their railroad across the northern road near Southampton, by laying trams on the road. His Honour reviewed the Northam-road Act and the Highway Acts, and expressed his opinion that the Northam-road was not a turnpike-road within the meaning of that section of the Railway Act by which the company was required to make a bridge or a tunnel in crossing a turnpike-road. Upon the question of acquiescence, his Honour was also of opinion that the company had been permitted ever since April, 1837, to deal with the Northam-road in the manner which was now complained of; and that there was, therefore, no ground for granting the injunction; but he would give the plaintiffs liberty to bring an action upon the point whether their road was a turnpike-road within the meaning of the Railway Act.

Taff Vale Railway.—[Compensation Case]:—We had a special jury case here on Saturday last, which excited a good deal of interest. It was to determine the sum to be paid by the railway company for 16 acres of land belonging to the Marquis of Bute, near the ship canal, which his Lordship is constructing here. Mr. Sergeant Wilde was counsel for his Lordship, Sir F. Pollock and Mr. Talbot for the company. The amount claimed before the jury was 21,426*l.* 17*s.*, being the valuation of their principal witness, Mr. Adam Murray. After a severe cross-examination of this witness by Sir F. Pollock, the company declined calling any witnesses, although they had a considerable number in attendance. Sir F. Pollock made a powerful address to the jury, who, after retiring an hour, returned a verdict of 10,141*l.*

STEAM NAVIGATION INTELLIGENCE.

Awful American Steam-boat Accident.—As the "George Collier" steam-boat was proceeding from New Orleans to St. Louis, on the 6th of May last, a serious accident was caused by the piston-rod giving way where the key passes through the T head, which broke the forward cylinder head and carried away a part of the boiler stands; the steam which escaped scalded 45 persons, who were in the after-cabin, 26 of whom died from the effects of the accident.—From *N. O. Picayune*.

British Queen.—This splendid vessel was expected to be at Liverpool on the 29th June, to leave on Saturday, call at Cork for a supply of Welsh coals (she can hardly get into any of the Welsh harbours); and to be at Blackwall on the 3d of July. On the 10th, as per advertisement, she will leave London on her first voyage for New York, and Portsmouth on the 11th. Every attention has been paid to the comfort of the passengers, and we are informed, her fittings-up are elegant. She makes up 220 beds, and on an emergency can fit up 250. We hear that the applications for passages in this magnificent vessel have been very great. Junius Smith, Esq., the gentleman who first suggested and maintained the practicability of steaming the Atlantic, will sail in her.

City of Aberdeen Steam-ship.—This vessel, which sailed on Saturday

evening, the 8th of June, from London, arrived in Aberdeen on Monday, in the extraordinary short time of 43½ hours.—*Times*.

Cause of Steam-boat Accidents in the United States.—Professor Hare, of Philadelphia, thinks the most productive cause of explosions is the undue heating of the metal, when there is a scarcity of water, by which an explosive gas is evolved. That high-pressure steam should be prevented, so that no drunken engineer, or racing captain, should have the lives of the passengers in their power, and in jeopardy too. Also, that a safety-valve, accessible to all, ought to be in universal use, and the extreme pressure allowed, to be inscribed in large letters.—From a correspondent of the *Athenæum*.

Exportation of Iron Steam-boats.—The materials, from the manufactory of Messrs. Laird and Woodside, have been shipped for the construction of three iron steam-boats, in large pieces of plate iron, riveted together, each forming a section or portion of the respective boats for which it was moulded or fashioned, so that the whole may with facility be put together on arrival at their port of destination (Monte Video, South America). The plates are from a quarter of an inch to three-eighths in thickness, and are beautifully rivetted. The engines to propel these vessels are, we learn, from 23 to 39-horse power.—*Liverpool Paper*.

East India Company's Steam-ship the Queen.—This vessel was launched from the yard of Messrs. Curling and Young, at Limehouse, on the 30th of May, and is intended to navigate the Indian rivers; no expense has been spared to render her perfect. She is 230 feet in length, 29 feet in breadth, exclusive of the paddle-boxes, and of 800 tons burden. Her machinery and engines are erecting by Messrs. Seaward and Co. with all possible expedition.

Fire King Steam Yacht.—A correspondent to the "Athenæum" describes this vessel as the property of Mr. Ashton Smith, of Wales, burden 660 tons, engines 220-horse power; the water lines adopted in this vessel are those proposed by Mr. Scott Russell, to admit the vessel's passing through the water with the least resistance. A gentleman who was on board at one of her trials says she performed at the rate of 15 miles an hour through water nearly fresh, and has performed the voyage from Liverpool to Greenock and back, each way in less than 15 hours, without canvas.

Great Western Steam-ship.—This fine vessel, which sailed from Kings-road, Bristol, on the 18th May, reached New York on the night of the 31st, after the quickest passage ever made to the westward, viz. 13½ days, with 103 passengers.—*Liverpool Albion*.

Iron Ship.—The largest iron sailing ship in the world is now building in Messrs. J. Ronald and Co.'s yard, Fortdee, Aberdeen. This stupendous vessel is of the following dimensions:—Length of keel, 130 feet; breadth of frame, 30 feet; depth of hold, 20 feet; length over all, 137 feet; tons register, 537. Judging from her appearance, she is a beautiful model, and will carry an immense cargo on a small draught of water. She is intended for a company in Liverpool.—*Aberdeen Herald*.

Liverpool Steamer.—Lieut. Frayer, R.N., arrived from New York at Liverpool, after a passage of 14 days, 10 hours. She brought 86 cabin passengers. She sailed again from Liverpool for New York on Thursday morning, 13th June, with 74 passengers, upwards of 10,000 letters, and a large quantity of fine goods.—*Liverpool Mail*.

President Steam-ship.—The works of this ship are proceeding rapidly; there are a great many workmen employed in her construction by the builders, Messrs. Curling and Young. She is very nearly planked, and

every care seems to be taken to secure her timbers, &c., properly together with iron and copper fastenings. She seems to be an excellent form, having a wider beam and deeper hold than the British Queen.

Steam from Liverpool to Halifax and Boston.—The "Glasgow Constitutional" publishes the following particulars respecting this project:—"Mr. Cunard has associated with himself a party of influential merchants in Glasgow; and the vessels will be much extended beyond the sizes and power stipulated for by the Admiralty, so that the whole will be completed on a scale corresponding to the magnitude of the undertaking. The vessels which are being built will exceed 1,250 tons burthen and 450-horse power, and are to sail from Liverpool for Halifax twice every month; and as there will be corresponding steam communication regularly from thence to Boston, and to Quebec (*via* Pictou), the route will afford the utmost facility and comfort to passengers travelling between the United States and British North America."

Steam Communication between New York and Antwerp.—According to a Belgian paper, a company is in course of formation for the establishment of a regular steam communication between Antwerp and New York. The requisite capital, we are told, has already been subscribed.—*Times*.

Steam Navigation between Boston and England.—The arrangements have been completed for establishing three steamers on this line of 1,000 tons each, and the British Government have contracted for eight years to pay the proprietors 270,000 dollars every year, for the transportation of the mails in these ships. They will ply once a fortnight, after the first of May, 1840, calling at Halifax and Nova Scotia.—*Boston Traveller*.

Steam-boat Speed.—The Royal Sovereign, an iron steamer, last week performed the distance from Glasgow to Liverpool (225 miles), in 20 hours and 20 minutes, including above one hour stoppages.—*Sheffield Patriot*.

Transatlantic Steam-ships.—The following tabular statement was furnished by a correspondent to the "Liverpool Mail" of the comparative dimensions and capacities of those three steam-ships:—

	British Queen.	Liverpool.	Great Western.
Extreme length	275 feet	223 feet	236 feet
Length under deck	245 "	216 "	212 "
Do. keel	223 "	209 "	205 "
Breadth within paddle-boxes	37½ "	30½ "	35½ "
Do. including do.	64 "	56½ "	59½ "
Depth at midships	29½ "	19½ "	23½ "
Tonnage	1,863	1,149½	1,340
Tons of space	1,053	559½	679½
Tonnage of engine-room . . .	963	581	641½
Horse power	500	468	450
Diameter of cylinder	71½ inches	75 inches	73½ inches
Length of stroke	7 feet	7 feet	7 feet
Diameter of paddle-wheels . .	30 "	28½ "	28½ "
Extra weight: engines, } boilers, &c., water . . }	500 tons	450 tons	480 tons
Ditto, coals	600 "	600 "	600 "
Ditto, cargo	500 "	250 "	250 "
Draught of water, with } above weight and stores. }	16 feet	16½ feet	16½ "

Preston and Wyre Railway.—It is expected that this line will be opened to the public by about May next, and that the lighthouses and several other important improvements in the harbour will also be completed by that time.

PARLIAMENTARY PROCEEDINGS.

HOUSE OF COMMONS.

BRISTOL AND GLOUCESTER, June 17, message, Lords, have agreed to the Bill: June 18th, Lords' amendments agreed to.—COMMERCIAL (LONDON AND BLACKWALL), June 6, repd.; rept. to lie on the table, and be printed: June 11, pet. from the wards of Aldgate and Portsoken, London, against; to lie on the table: June 18, rep. further considered; amendments read second time; Bill to be engrossed: June 20, read 3, and passed.—DUBLIN AND DROGHEDA, June 20, pet. for leave to pres. pet. for a Bill; ref. to the Select Committee.—EDINBURGH, LEITH, NEWHAVEN, May 28, rep. further considered; amendments agreed to; Bill to be engrossed: May 30, read 3; clause added; amendments made; Bill passed: June 21, Lords have agreed to the Bill.—GREAT WESTERN, June 3, Lords' amendments agreed to.—GREAT NORTH OF ENGLAND, June 6, Lords agreed to the Bill: June 7, Lords' amendments agreed to.—LIVERPOOL AND MANCHESTER (EXTENSION), June 6, Lords have agreed to the Bill with amendments: June 7, Lords' amendments agreed to.—LONDON AND SOUTHAMPTON (PORTSMOUTH BRANCH), May 31, Lords' amendments agreed to.—LONDON AND BIRMINGHAM, May 30, read 3, amendments made, Bill passed: June 11, message, Lords have agreed to the Bill.—MANCHESTER AND BIRMINGHAM, May 30, repd.; rept. to lie on the table, and to be printed: June 11, rep. further considered; amendments agreed to; clauses added; amendments made; Bill to be engrossed: June 13, read 3, and passed.—MANCHESTER AND BIRMINGHAM (EXTENSION), May 30, pet. of S. S. Baxter, ordered to be heard against: June 4, ordered that minutes of evidence taken before Committee on the Bill be printed, at expense of parties, from Committee clerk's copy, if they think fit: June 5, pet. from Bolton-le-Moors in favour, to lie on the table: June 10, time enlarged for Committee to report till Monday, 24th June: June 11, power to Committee on petitions of the Earl of Lichfield and Mr. Baxter to report opinion and minutes of evidence, from time to time: June 12, rep. from Select Committee on petitions of the Earl of Lichfield and Mr. Baxter, brought up and read: to lie on the table, and to be printed: June 14, pet. from Stockport in favour, to lie on the table.—MANCHESTER AND LEEDS, May 28, rep. further considered; amendments agreed to; Bill to be engrossed: May 30, read 3, and passed: June 17, Lords have agreed to the Bill: June 19, Lords' amendments agreed to.—NORTHERN AND EASTERN (No. 1), June 4, read 3, and passed.—NORTHERN AND EASTERN (No. 2), June 4, read 3, amendments made, and Bill passed.—NORTH MIDLAND, June 14, Lords' amendments agreed to.—PRESTON AND WYRE RAILWAY AND PRESTON AND WYRE HARBOUR AND DOCK BILL, June 11, report further considered; amendments agreed to; clause added; amendments made; Bill to be engrossed: June 13, read 3, and passed: June 21, Lords have agreed to the Bill.—RAILWAY COMPANIES, June 11, account of the several amounts borrowed by the Railway companies now before Parliament, in anticipation of calls of their capital stock [ordered April 9], laid on the table: June 12, this account referred to the Select Committee.—RAILWAYS, June 5, pet. of chairman of Arbroath and Forfar Railway Company, for imposing a fixed per centage tax on railway passengers; referred to the Select Committee.—RAILWAYS (IRELAND) May 30, rep. thereon; consideration on Monday next, June 4, deferred till Friday: June 4, pet. from Carrickfergus against the proposed measure, to lie on the table; from the chairman of the Dublin and Drogheda Railway Company, for empowering the Board of Works to make loans to

existing companies, to lie on the table: June 15, pet. of proprietors and inhabitants of Connaught, to be included in the proposed measure, to lie on the table: June 17, pet. of the president of the Chamber of Commerce of Waterford, for the construction of a branch railway from the main line to Waterford, to lie on the table: June 22, rep. thereupon deferred till Friday next.—RAILWAYS COMMITTEE, June 7, Mr. Childers added to the Committee: June 19, Lords' message [18 June], requesting copy of rep., considered; printed copy to be communicated to the Lords.

SOUTH-EASTERN (No. 2) May 28, to be read 2, on Thursday: May 30, read 2, and committed to Mr. Hodges and the East Kent list: June 10, repd., and rep. to lie on the table, and be printed: June 18, report further considered; amendments agreed to; Bill to be engrossed: June 19, read 3; amendments made; Bill passed. June 4, message from the Lords, that they have agreed to the Bill; June 5, Lords' amendments agreed to.

. These proceedings are to June 21st inclusive. The two following to the 26th:—

MANCHESTER AND BIRMINGHAM EXTENSION, June 24th, time enlarged for committee's report to July 4.

RAILWAYS (IRELAND), June 25, pet. from Rathfriland, for aid to existing companies, to lie on the table.

HOUSE OF LORDS.

BRISTOL AND GLOUCESTER Bill, May 28, numerous pets. against, to lie on the table: May 30, repd. from the Standing Orders Committee, and leave given to proceed: May 31, numerous pets. in favour read, and ordered to lie on the table; Bill read 2d, and committed, Committee proposed by the Lords' Committees: June 3, several pets. in favour read, and ordered to lie on the table: June 4, another from William Herapath, Esq., of Bristol, against, read, and ordered to lie on table; Committee appointed, consisting of the Earl of Zetland, Lord Gage, Lord Colchester, Lord Bexley, Lord Heytesbury; to meet on Tuesday next, at eleven o'clock: June 7, the House being informed by the chairman of Committees that the opposition to this Bill was withdrawn, the Committee was discharged, and the Bill committed to all the Lords present this day; to meet on Tuesday next: June 14, repd. especially with amendments: June 17, read 3d, with amendments; Bill passed and sent to the Committees: June 20, returned from the Commons with amendments agreed to.—BALLOCHNEY, June 4, the opposition to this Bill was withdrawn, and Committee on it was discharged, and Bill committed to all the Lords present this day; to meet on Thursday next.—COMMERCIAL (LONDON AND BLACKWALL), June 20, read 1st, and ref. to the Standing Orders Committee on Tuesday next: June 21, pet. complaining that the Standing Orders had not been complied with, and praying to be heard in support of the allegations on the part of inhabitants of the wards of Aldgate and Portsoken, in the city of London, and others; read, and refd. to the Standing Orders Committee.—EDINBURGH, LEITH, AND NEWHAVEN, May 31, read 1st: June 4, read 2d, and committed for Friday next: June 6, order for the Committee to meet to-morrow discharged, and Bill refd. to the Standing Orders Committee on Tuesday next: June 11, pet. against parts of the Bill, of the Magistrates and Town Council of Leith, read, and ordered to lie on the table: June 13, repd. specially from the Standing Orders Committee, and leave given to proceed: June 14, Committee to meet on Monday next, and the pet. of the magistrates and town council of Leith against parts of the Bill [pres. Tuesday last], ref. to the Committee: June 18, repd. specially without amendments: June 20, read 3d, and passed.—GREAT

NORTH OF ENGLAND, May 30, pet. of inhabitants, owners, and occupiers of land in the several townships of Thornton-le-Moor, Thornton-le-Beans, Borrowby, South Otterington, Newby Wiske, Kirby Wiske, Newsham, and Maunby, in the North Riding of the county of York, for the insertion of a clause to compel the company to make a coal dépôt and carriage-station house at Thornton-le-Moor; read, and referred to the Committee on the Bill: June 4, repd. with amendments: June 21, read 3d, and passed, and sent to the Commons: June 7, returned from the Commons with the amendments agreed to: June 14, received the Royal Assent.—**GREAT WESTERN**, June 3, returned from the Commons, with the amendments agreed to.—**LONDON AND BIRMINGHAM**, May 31, read 1st: June 4, read 2d and committed for Friday next: June 18, repd. without amendment: June 11, read 3d and passed: June 14, received the Royal Assent.—**LONDON AND SOUTHAMPTON (PORTSMOUTH BRANCH)**, June 3, returned from the Commons with the amendments agreed to.—**LIVERPOOL AND MANCHESTER EXTENSION**, May 30, repd. from the Standing Orders Committee, and leave given to proceed: June 6, read 3d, with the amendments, and passed, and sent to the Commons: June 7, returned from the Commons with the amendments agreed to: June 14, received the Royal Assent.—**MANCHESTER AND LEEDS RAILWAY BILL**, May 30, read 1st, and ref. to the Standing Orders Committee on Tuesday next: May 31, pets. complaining that the Standing Orders had not been complied with, and praying to be heard in support of the allegations; of the warden and fellows and other clergy of the collegiate and parish church of Manchester; and of the Churchwardens and overseers of the poor of the township of Manchester; read and ref. to the Standing Orders Committee: June 6, repd. especially from the Standing Orders Committee, and leave given to proceed: June 7, read 2d, and committed for Tuesday next: June 7, pets. from same parties to be heard against; read, and ordered to lie on the table; order for the commitment of the Bill to all the Lords present this day *discharged*, and the Committee to be proposed by the Lords' Committees on opposed Bills.—June 10, the Earl of Dartmouth, the Earl de Lawarr, the Earl of Bandon, Lord Douglas, Lord Calthorpe, appointed as a Committee on the Bill; to meet on Wednesday, at eleven: June 13, repd. especially with amendments: June 14, read 3d, with amendments: an amendment made; Bill passed and sent to the Commons: June 20, returned from the Commons with amendments agreed to.—**MANCHESTER AND BIRMINGHAM**, June 13, read 1st, and ref. to the Standing Orders Committee, on Tuesday: June 20, repd. from the Standing Orders Committee; leave to proceed: June 21, read 2d, and committed for Tuesday next.—**MONKLAND AND KIRKINTILLOCH**, June 14, pet. praying to be heard by counsel against, from Robert Stewart, Esq., of Carfin, read, and ordered to lie on the table: June 17, the Earl of Sandwich, Earl of Lovelace, Lord Seffield, Lord Dunmore, and Lord Wenlock, appointed as Committee on the Bill; to meet on Thursday at eleven.—**NORTH MIDLAND**, June 3, opposition withdrawn, and Committee discharged, and Bill committed to all the Lords present this day; to meet tomorrow: June 6, rep. especially with amendments: June 7, read 3d, with amendments; Bill passed and sent to the Commons: June 14, returned from the Commons with amendments agreed to.

The above contains a portion of the proceedings to the 21st inclusive, the remainder and subsequent proceedings are deferred for want of room to our next.

PRICES OF RAILWAY SHARES.

Those finished are marked (1); in progress (2); which have their Bills, but are not begun (3); others (4).

NAMES OF RAILWAYS.	No. of Shares.	Share.	Paid.	Prices sold at.			Dividend per Cent.
				High-est.	Low-est.	Latest Price.	
		£.	£.				
(2) Birmingham and Derby . . .	6,300	100	70	65	60	60	
(2) Birmingham and Gloucester . .	9,500	100	50	30	28	28	
(2) Birm., Brist., & Thames Junc. .	7,500	20	18	...	...	9	
(2) Bristol and Exeter	15,000	100	25	12	10	11	
(2)† Bolton and Preston	7,000	50	20	6	7½	7½	
(2) Cheltenham and Great Western .	7,500	100	35	7	6½	6½	
(2)* Chester and Crewe	5,000	50	25	22½	19½	19½	
(2)* Do., Birkenhead	5,000	50	35	40½	40½	40½	
(2) Commercial, Blackwall	24,000	25	11	9½	8½	8½	
(2)† Dublin and Drogheda	6,000	100	10	8	8	8	
(2) Eastern Counties	64,000	25	16	10½	9	9	
(2) Edinburgh and Glasgow (old) .	18,000	50	10	5	5	5	
Ditto, ditto (new)	5,000	...	5	...	...	4	
(2) Edinburgh, Leith, & Newhaven .	5,000	20	7	...	...	4	
(2)† Glasgow, Paisley, and Greenock .	16,000	25	8	10½	10½	10½	
(2)† Glasgow, Paisley, and Ayrshire .	12,500	50	20	16	16	16	
(1)* Grand Junction	10,400	100	100	204	201	201	12
(3) Gosport Junction	6,000	50	5	9	7½	7½	
(2) Great Leinster and Munster . .	8,000	100	5	...	...	18s 6d	
(2) Great North of England	10,000	100	35	20½	20	20½	
(2)* Great Western	25,000	100	65	75	74½	74½	
(4) Harwich	11,000	20	1	...	...	½	
(2)† Hull and Selby	8,000	50	25	14½	14½	14½	7½
(2) Llanelly Railway & Dock Co. . .	2,000	100	70	...	...	70	10
(1)* Liverpool and Manchester . . .	7,968½	100	100	195	194	194	
Ditto ¼ shares	546	25	25	46½	46½	46½	
Ditto ½ shares	7,968	50	50	76½	76	76	
(1)* Leicester and Swannington . .	1,500	50	50	73½	73½	73½	8
(2) London and Brighton	36,000	50	22	13½	7½	12½	
(1) Do. and Birmingham	25,000	100	90	169	157½	157½	
Do. ½ Shares	25,000	25	5	28½	25½	25½	
Do. New Shares . . . . .	...	...	8	24	24	24	
(1) Do. and Greenwich	20,000	20	20	17	16½	16½	3
Do. New Shares . . . . .	...	...	20	...	...	19½	
(2) Do. and Southampton	20,000	50	50	46½	43½	44	
Do. do. New	16,000	25	20	...	...	...
(1) Do. and Croydon, Trunk	20,000	20	16½	13½	11	12½	
Do. New Scrip	6,666	20	10½	...	...	8½	
(1)† Leeds and Selby	2,100	100	100	70	70	70	
(2) Manchester and Birmingham . .	30,000	70	15	11	9	9	
(4) Do. and Do. Extension	15,000	70	7	5½	5½	5½	
(2)* Do. and Leeds	13,000	100	50	64½	60½	64½	
Do. New Shares	10,000	50	5	9½	9½	9½	
(2) Maryport and Carlisle	4,000	50	32	...	...	7	
(2) Midland Counties	10,000	100	70	43	41½	43	
(1)§ Newcastle and Carlisle	6,000	100	100	105	102½	105	4
Ditto ¼ shares . . . . .	...	25	25	25	25	25	
(2) Northern and Eastern	12,000	100	18	7	5½	7	
(2) North Midland	15,000	100	65	61½	59½	60	
(1)* North Union	3,200	100	100	67½	57½	67½	
Do. New Shares	3,200	50	50	...	...	64½	
(2) Preston and Wyre	2,600	50	44	...	...	42	
(4)† Sheffield and Manchester . . .	7,000	100	10	4	4	4	
(2)† South-Eastern and Dover . . .	28,000	50	12	3½	3½	3½	
Do. New Shares . . . . .	...	...	15	4	3½	4	
(1) St. Helen's, Runcorn Gap. . . .	...	...	100	...	...	40½	
(1)§ Stockton and Darlington . . .	1,000	100	100	205	205	205	14
(2) Thames Haven	9,000	50	5	...	...	...
(2) York and North Midland	6,700	50	30	32	28½	32	

* Those with a * are the Liverpool prices, which are to the 25th inclusive. † Scotch.
 ‡ Manchester. § Newcastle. The others are London prices to the 27th.

THE RAILWAY MAGAZINE;

AND

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NEW SERIES.

Theory and Construction of the Turbine. By the EDITOR.

THE following paper is a part of the article, with some alterations, mentioned in our last, that we had drawn up before receiving Mr. Rennie's.

NOTICES OF THE TURBINE.—A great noise has lately been made in Germany and France about an invention, chiefly by M. Fourneyron, of a water-wheel something on the principle of Barker's mill, which it is said contains a secret in construction, bidding defiance to theoretical development, and known only to the inventor, after 15 years of laborious experiment.

Surrounded with such a fortress of acknowledged difficulties, rendered still more fearful of approach by the testimony of M. Arago, as we understand that he could form no conception of the theory of the turbine, it might be considered presumption in us to attempt to penetrate the arcana of these sacred mysteries. Nevertheless, we have dared to try, and we believe we have found the adits, and have entered some way into the awful edifice. Whether we have gone so far in as M. Fourneyron, or in the precise direction that he has, our readers will in the sequel be able to judge. If, in their opinion, we have not, we trust at least we shall have furnished them with an instrument as simple and as powerful as Fourneyron's, without seeking to make any profit or mystery of it. We hope too, that the plan and principles we have developed may present mechanics with the means of constructing that great desideratum—a simple and efficient rotary engine.

Several communications have been made to the French Academy of Sciences on this subject. M. Morin stated, at

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their sitting, September 25, 1837, that these wheels had been subjected to experiments, and that it was found that they worked equally well under great and small falls—that their useful effect was from 70 to 78 per cent. of the absolute motive force—that they worked at very different velocities either above or below the maximum effect, without any sensible loss of useful effect—that they would even work at the depth of a metre under water without notable loss. A letter from M. Fourneyron to M. Arago, dated Augsburg, 17th September, 1837, states that he has been working one in the Black Forest under a pressure of 108 metres (354·348 English feet), or 15 atmospheres, which has succeeded most perfectly, giving out 75 per cent. of useful power, and making 2,300 revolutions per minute; and that he was then about to construct two at Augsburg of 180-horse power, at a spinning manufactory. In a subsequent letter, read to the Academy, November 27, M. Arago said, that the turbine in the Black Forest was only one-third of a metre (13·1237 English inches) in diameter, (radius?) and under a pressure of 108 metres of water, turned 2,300 times a minute, and realized 60-horse power, at the expense of only 30 cubic décimètres, or 1·06 cubic feet* of water per second.

At the sitting of the Academy on the 2d January, 1838, a report by MM. Prony, Arago, Gambey, and Savary, on the turbine was made. This report was highly favourable; but the theory and the proportions of the parts are not given. "M. Morin," (who made the experiments), "ne pouvait, il le déclare, penser même à le devancer dans le publication de ces détails."

All that they say is—having described M. Burdin's water-wheel, which first obtained the name of turbine, and which, as our readers probably know, consisted of an upright drum or cylinder, half the height of the entire disposable fall, the water entering at the upper base, and after following spiral canals about the surface of the drum left at the bottom—"that in Fourneyron's turbine the drum is only a few décimètres (a décimètre is near four inches) thick; that the water is lanced obliquely in horizontal jets from all the contour of the interior vertical cylinder, penetrating on all sides to the compartments of the wheel, which in turning flushes (affleure) this cylinder, following the curved canals (aubes) enclosed between the two horizontal bases, and escaping horizontally by a vertical slit in the exterior

* The translator in No. 23, p. 51, must have mistaken, décigramme for décimètre.

drum. We may have an idea," they observe, "of the turbine by conceiving an ordinary wheel laid down flat, having curved palettes, and that the water arriving on these palettes at the centre goes out at the circumference."

There is little to be gathered from these general descriptions. "Grave difficulties" (say they) "present themselves in the execution; the water, to produce the best effect, should enter without shock, and leave without velocity. How to give to the liquid jets lanced into the wheel, the most advantageous direction? How to make them leave without difficulty after having spent their force on the aubes? How with these simple conditions to have effects varying but little, while, if needful, the wheel may have very different velocities? are a part only of the questions which M. Fourneyron has patiently and ably solved by experience."

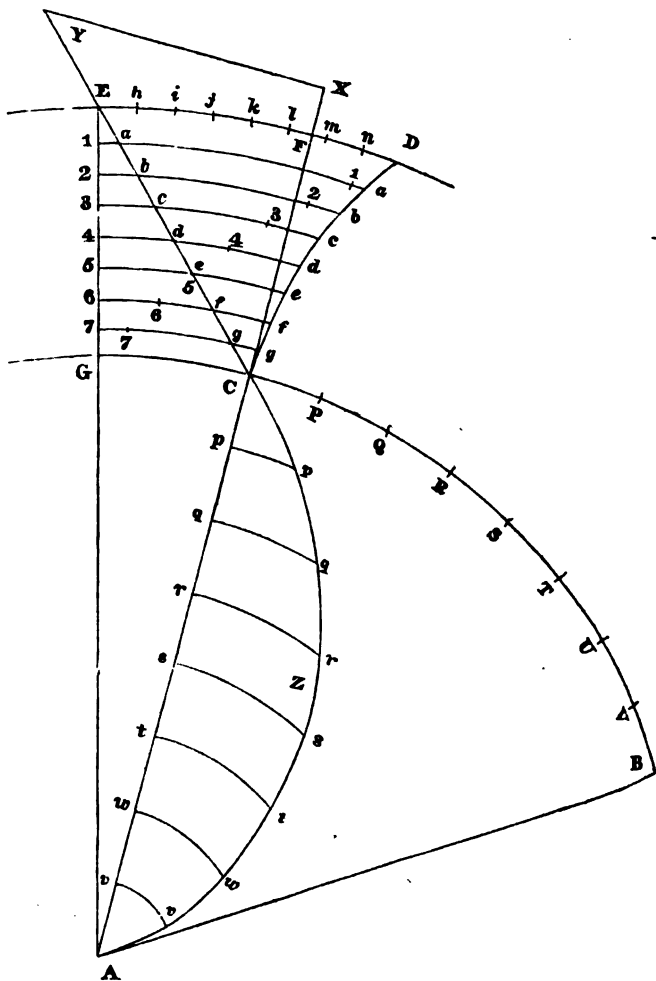
On the 5th of February, 1838, another communication was made to the Academy by M. Dieu, on one of Fourneyron's turbines, put up at a mill of M. Rabourdin, at "Lapene, Canton d'Arpajon." In this communication he mentioned eight experiments on the turbine, in which he deduced the effective power equal to 77 per cent. of the theoretic. Whether it be owing to our dulness, or what, we cannot say; but certainly we are unable to avail ourselves of these experiments for any useful purpose. They appear to us to be deficient in data.

Theory and Construction.—Our readers will perceive by the description and diagrams in Mr. Rennie's paper, in our last—the first and only one given to English readers, we believe—that the turbine is an instrument in which the water enters at the centre, and after passing through the curved canals, *AZC*,* of a fixed drum, issues out obliquely into other curved canals, *CD*, in a moveable annulus or ring—closely surrounding the drum, but not so as to rub it—from which it is rejected at the outer circumference. By the action of the water on the canals of the ring or turbine, it is driven rapidly round in the opposite direction in which the water issues from the canals of the drums, and, as Mr. Rennie says, carries with it all the machinery.

The secret of this instrument, as the report of the French academicians says, lies in constructing the curves and laying out the angles in which the water from the drum shall issue into the canals of the turbine, so as to enter without shock, and leave them without velocity.

* We here give but one canal in the drum, and one in the turbine or circumscribing ring.

In Barker's mill the water runs through a straight canal AB , and at B escapes by a slit or sluice perpendicular to the radius towards V , driving the mill round in the direction from V to B . As the mill, however, moves round, it must give motion to the successive portions of water flowing through the canal, which operate as a perpetual drag to retard the mill. If, therefore, a curved canal, $A v w t$, &c., C



was so constructed that when the wheel or mill is revolving with a given uniform velocity, the several points of this curve should so fall into the line AB , as to coincide with a point moving uniformly through AB , then the motion of water in a revolving canal of uniform size, whose centre coincides with the said curve, will obviously be precisely the same as that of water flowing uniformly through a canal of equal section, whose centre is the fixed right line AB . The operation of water in this revolving canal will be exactly the same as if it was acting from a state of rest on the wheel. The nature of this curve is easily deduced from the relative velocities of the circumference of the wheel, and of the water supposed to flow through AB .

Suppose while the fluid would run through the radius AB , the wheel would describe the angle CAB ; then, if the curve be divided into any number of equal parts in P, Q, R , &c., and the radius AC into the same number of equal parts in p, q, r, s , &c., radii drawn from P, Q, R, S , &c., to A , will meet circles round the centre A , passing through p, q, r, s , &c., in the radius, in corresponding points p, q, r, s , &c., in the curve sought. For as V, U, T , &c., successively fall on B by the motion of the wheel, the points v, w, t , &c., in the curve, will obviously fall contemporaneously on the radius AB , which will be a tangent to the curve at A . Hence if A denote the whole angle CAB , z be any other angle made with AC , and x be any corresponding distance from A , we have $A : z :: R : x$, supposing R the radius AC . This is the equation of the curve, which is therefore a simple spiral.

Such would be the curve if the drum itself revolved. And if the arc CB was exactly equal in length to the radius AC , the wheel and water would have equal velocities. Consequently a sluice at C rejecting the water in the direction of the tangent, will give the water the same effect on the wheel in motion as it would in Barker's mill at rest, all other things alike.

If the velocity of the wheel was not so much as that of the water in the radius, the water would constantly tend to accelerate the wheel; and on the contrary, if greater, to retard it.

It is almost superfluous to add, that the sluice and section of the canal should be of the same area, or very nearly so, allowance being made for the contraction of the escaping fluid.

We have been the more minute in this description, because

of the apprehended importance of this part to a rotary engine, and because the same principles apply to the turbine. We shall now, therefore, develop the construction of that part more particularly designated by the name of turbine by the French and Germans.

If we suppose the drum to be at rest, and the water to issue through the curved canal we have been describing, it would leave it at C , supposed an open end, and flow, with the velocity due to its pressure, uniformly along the right line CE , a tangent to the curve AC at C . Divide CE , cutting the two circumferences at C and E , into any number of equal parts in the points a, b, c , &c., and through these points describe circles about A . Suppose now, the turbine to revolve uniformly with such velocity that some point D would arrive at E in the same time that a particle of water, by its proper velocity would go from C to E . Let the arc ED be also divided into the same number of equal parts in which CE is, that is, in h, i, j , &c. Then if radii be drawn through these points to cut the circles, passing through a, b, c , &c., they will intersect them, suppose in $7, 6, 5, 4$, &c.

Set off from g, f, e, d , &c., on the circles gg, ff, ee , &c., respectively equal to $77, 66, 55$, &c., and the centre of the canal of the turbine will pass through these new points g, f, e , &c., to D . For as the point D revolves towards E , the g, f, e , &c., points in the curve, will evidently coincide with the g, f, e , &c., in CE , as h, i, j , &c., respectively fall on E ; and the motion of the water in the turbine curve CD will absolutely be in the right line CE . If, therefore, it be rejected at D by a sluice sending it out in the opposite direction to E , in a tangent to the circumference of the circle at D , it will have the same pressure on the revolving turbine as it would if sent out at E in a tangent to the radius AE , or the turbine at rest.

We have now explained the nature and construction of the curve in the turbine generally; but the object is to find out that particular curve and that particular angle, at which the water should issue from the drum, so that the effect should be a maximum. This constitutes a grand part of the secret of M. Fourneyron.

From what we have already shown it appears that if the water leaves the turbine with a less velocity than this machine revolves with, it must be partly carried round with it, giving, mathematically speaking, a loss of effect; and if it leave it with a greater velocity, the instrument is not doing the duty it ought according to the pressure. Consequently,

the most useful velocity is when the velocities of the turbine and issuing water are equal. We are here of course speaking of the exterior part of the turbine, whence the water issues. Hence ED should equal CE , and $Eh = Ea = ab = \&c$. Therefore,

Eh or $Cg : 77$, or $gg : : AE : Ag$, or AC
in the nascent state of the triangle. Consequently, Cg is to gg in a given ratio in the nascent state, and gg is perpendicular to AC .

Now when the turbine is at rest, the water impinging obliquely on the canal tends to drive it round with a force proportional to its velocity, and the sine of the angle gCg . If Cg , therefore, denote the velocity of the water, the perpendicular from g on the canal CD must be a maximum to produce the greatest effect. But since Cg and gg have a given ratio, and we suppose Cg invariable, this maximum is evidently when Cg in the curve is perpendicular to gg ; that is, as gg is perpendicular to AC , when Cg nascent is a part of AC produced, or AC is a tangent to the curve CD at the point C .

Hence, to find the angle of maximum effect ECF , construct on CF the right angle triangle CXY , to have CY holding the same ratio to YX that the radius AF of the turbine has to the radius AC of the drum.

We must not fail to observe that this angle of maximum effect is only to set the turbine in full motion from a state of rest in the shortest possible time; for when revolving with a velocity equal to that of the escaping fluid, the water enters without shock and leaves without velocity.

It is also to be observed that the nearer AC approaches to an equality with AF , the more open will be the angle ECF , and the more powerful will the water be to give the turbine the most useful velocity. Should the angle ECF be half a right angle the ratio of AF to AC must be that of $\sqrt{2}$ to 1 or of 1 to $\cdot 707$ apparently that of the diagram in our last, and of another of one of these instruments we have met with elsewhere.

We have gone to too great a length to say anything at present of the other properties of this machine, or to give the calculations we have made on it, for an application to steam-vessels and locomotives. We shall, however, just mention this one, which forms a distinctive feature of M. Fourneyron's wheel, namely, that it is obvious the velocity of the turbine will accommodate itself to any pressure of the fluid, since it is expressly constructed on the principle of

revolving, when producing the most useful effect, at the same rate as the water issues out. The wheel will also evidently work above and below its maximum effect without any material difference, which is another property noticed by M. Fourneyron.

It now only remains for us to add, that whether we have given the identical construction of Fourneyron or not, we hope it will be found that we have laid open the principles of an instrument not less simple, efficient, or useful. At another opportunity we may resume the subject and go further.

Steam-ship Archimedes. By F. P. SMITH, Esq.

TO THE EDITOR OF THE RAILWAY MAGAZINE.

DEAR SIR,—In your Magazine for the present month (June) I perceive a report on the performance, dimensions, &c., &c., of my new vessel, the Archimedes steamer; but as it contains several errors, I beg to furnish you with means of correcting them, and some additional information, which if you think worth inserting in your *next* number [it reached us several days too late] it is much at your service, and, as a constant reader of the Magazine, I shall feel particularly obliged by your doing so.

I am, Sir, yours obediently,

1, *Wade's-terrace, East India-road,* F. P. SMITH.
25th June, 1839.

Any further particulars respecting the Archimedes, I shall be most happy to furnish you with if required.

I hope my communication will not arrive too late. I should have forwarded it earlier, but have been so much occupied since the unfortunate explosion. F. P. S.

[We shall be very happy to receive any information respecting this invention, in which we take a great interest.—ED. R. M.]

The following are the real dimensions :—

Length between the perpendiculars	. 107 feet.
Length over all	. 125
Extreme width	. 22
Depth in the hold	. 13
Burthen in tons	. 237

She is built of English oak instead of fir. The experimental boat was 6 tons instead of 30. She accomplished from 7 to 8 miles per hour, and in September, 1837, she ran from Blackwall to Margate in 8½ hours, and proceeded

round the Forelands to the westward, on a cruise, during which time we experienced a good deal of heavy weather. The screw which propelled this boat measured only 2 feet in diameter, and 2 feet in length. The ship she towed into the *West India South Dock* was the British Queen instead of the Great Western.

Read funnel instead of tunnel.

Mr. Rennie's account of the performance is tolerably correct.

I believe, Sir, you are aware that the engines are 3 feet in the stroke, and are, therefore, calculated to perform upwards of 30 strokes per minute, but have never yet done more than 25, consequently it cannot be said yet the screw has had a proper and fair trial, although the result has been far more satisfactory than was very generally anticipated. The fact, however, of the vessel's having performed upwards of 10 miles per hour, for 25 strokes per minute of the engine, I think is very convincing of the effective properties of the screw as a propeller; and I have not the slightest doubt, when the engines are quite complete, the Archimedes will be one of the fastest and best of sea-going ships that leave the Thames, as I have proved by experiment. She increases her speed half a knot per hour for *every* extra stroke of the engine per minute. The trials were made both by the common and Massey's patent log, during a perfect calm on our return from Portsmouth, from 7 knots up to the highest speed of the vessel, and the result was perfectly uniform.

This part of the experiment, I own, seems somewhat strange, and differs very much from the theory generally of ordinary steamers; it is admitted that resistance of water increases according to the square of the velocity of the midship section of the vessel, the speed of which cannot be increased materially beyond 10 or 11 miles per hour; the cause of this I believe to be that the medium of resistance is at a certain depth or density, while the paddle is acting near the surface of the water, which is easily displaced, and driven into the air by a blow of the float or paddle, whereby a very considerable loss of power must be experienced. The screw is made to contain a superficial area nearly equal to the number of boards or paddles immersed at time of action, and this area being circular and in one body, acts precisely in the same medium of resistance as the vessel's bows, or midship section; therefore, if the fluid resists the onward progress of the vessel at a certain ratio, so must it also resist the action of the propeller in its stroke or back-

ward progress, according to the velocity at which it is driven.

The immersed section of the Archimedes is about 140 feet, and the area of her propeller about 32 feet, and yet she moves forward within 1-8th of the same speed as the screw—and how is this done? My practical experience enables me to say, that which has been thought by many scientific men to be the greatest drawback upon the screw as a propeller, is in fact its greatest and best property; viz., the obliquity of its action;—now this oblique form being continued the whole of the circle, it throws off the water at right angles from every portion of its surface in a column which then assumes the form of an inverted cone, the base of which is far greater in area than the midship section, and I find as the screw is turned quicker the base of the column is proportionately enlarged, whereby a greater resistance is obtained, and hence, to the surprise of many, the Archimedes is propelled at a rate of 10 miles per hour, at a loss not exceeding 1-8th, when in perfectly smooth water, and in rough the loss is not materially increased, as the screw remains wholly immersed, and not affected by the rolling of the vessel, as is the case with the paddle-wheel.

From all I have ever seen of paddle-wheels I believe it is not possible to drive their periphery beyond 16 or 17 miles per hour to advantage; whether large or small, as the surface of the water cannot stand a blow beyond that force; but I do not hesitate to say the speed of propelling by the screw is unlimited, provided you do not spare the power to give it the required number of revolutions.

P.S.—I think it will be needless for me to say the unfortunate accident which occurred on board the Archimedes, since your last notice of her, was entirely unconnected with the new propeller or arrangement of the engines. The boiler is now removed, and will be replaced by others on a different construction.

Turnpike Trusts, Coach Conveyance, and Railways.

By Mr. JOSEPH LOCKWOOD.

OF late the various newspapers, but especially the "Times," have been giving forth very long articles on the melancholy and doleful state of traffic and incomes on the common turnpike roads, and they all most strenuously recommend that the duty now imposed should be immediately repealed, for the purpose of enabling the coach pro-

prietors and others similarly interested to effectually compete with the railways, and yet most of the editors say that individually they are not in the least inclined to oppose the success of the railway system; but, however, their exertions in favour of the turnpike trusts would appear to the contrary, and show that they are really opposing this new system of transit.

At the eleventh hour the turnpike trustees have awoke from their quiet slumbers, and find it essentially necessary that all the heavy and burdensome duties that now oppress them should be altogether abolished, but before they felt the effects of cheap travelling and rapid communication they never troubled themselves particularly about these duties, which they then paid without any grumbling, because they could make their passengers repay them again; but now, when railways have started in full opposition for the public benefit, and carry both goods and passengers cheaper and quicker, they find that this duty ought to be immediately repealed, because they are under the necessity of increasing their prices just in proportion to this duty, so that the duty alone compels them to maintain their prices.

The time is not so long since when all the pack-horse and heavy lumbering wagon owners raised objections against canals, because they would interfere with their traffic; and so they did, and the pack-horses became extinct, except in certain districts, the canals triumphed, and for some years enjoyed it in silence. When the country at large began to appreciate the immense advantage of quick travelling, all hands and heads set to work with the intention of carrying it into full effect; the coach proprietors and others of the same class did what they could to extend the means, and increase the rapidity of conveyance, which was partially successful; after this came Telford and M'Adam, who improved our system of road-making, which made travelling better, but still the wants of the manufacturing community were not satisfied, and the spirit of commercial enterprise required still more rapid conveyance. Railroads were next introduced to satisfy these demands, and about the same time the coach conveyances were much further extended and improved, insomuch that they now travel from 10 to 12 miles an hour, with a good load and about a dozen or fifteen passengers.

Railways travel at about the rate of from 20 to 30 miles an hour with heavy loads of traffic or goods, and many passengers, therefore it must be quite obvious that the

country in this respect is so much the more benefited, and therefore so much the less ought the Government to be anxious to put any tax or obstacle on this improved mode of travelling, and thus in a great measure deprive the community of the advantages to be derived therefrom. I say deprive, for if they are taxed to satisfy the coach-owners, there will not be much benefit result from them in regard to cheapness of conveyance, which, combined with rapidity, is their grand aim.

Let them be unshackled. The less Government interferes with them the better. Let the Government grant as many Bills for railroads as they please, it will be for the benefit of the public, for numbers will excite competition, competition induce cheapness, cheapness give satisfaction.

Look to steam navigation, and take the Hull boats as an instance. Here we see plenty of boats constantly plying between that town and London, at prices reduced to comparatively nothing, and still they pay, for if not I should think that they would not be continued; and as most people are aware this was induced totally through opposition—for one company did their best to outvie the other, not only in cheapness and despatch, but in accommodation in the voyage. This is not the only instance that might be produced; there are numberless other cases, which all tend to prove most unequivocally that railroads will ultimately be cheaper than they are at present. And so it might be said of coaches, if the duty was taken off. Let us suppose this off—could they then ever compete with the railways? In this I of course only mean on the principal roads, for to allude to the others would be trifling, and a waste of time. Thus, Can the coaches on the western road compete with the Great Western Railway, or the conveyances on the Birmingham road with the railway to the same place?

It appears to me that they never will be able to do so, even under the most favourable circumstances. Suppose that they can convey passengers and luggage at precisely the same charge as the railways, would not the greater part of the people prefer travelling by the railroads merely on account of their superior rapidity? And would not the merchandize be sent by the same conveyance for the same reason? Every circumstance being taken into consideration, it is my firm conviction that they never will be able to compete with the railroads to any extent likely at all to be profitable to them.

Mr. Horne, in his evidence before the Committee on

"Taxation on Internal Communication," remarked that, *"to compete with railroads, it would be necessary to abolish the duty altogether."* Of this there can be no doubt; but even if it was taken off, they never would succeed, for in the course of a very few years, when the railways now in progress, and others planned, are finished, the present objections to railway travelling will be entirely removed, to the great disadvantage of the road conveyances.

Indeed, all circumstances appear to be combined against them. Coaches on the main line of roads have but a poor chance of succeeding; but on the branch roads, leading from the railroads to the different towns and villages within a few miles of the line of railway, they will unquestionably find plenty of employment in the conveyance of passengers and their luggage.

All the great coach proprietors, innkeepers, and others connected with common road conveyance, are quite sanguine in the expectation that if the different duties are taken off, they shall be able to compete effectually with railways, and thereby save themselves from the impending ruin that now stares them in the face. There is none but what regrets that loss should accrue to any class of people in carrying out new improvements; but it always has been, and always will be so. Still I think it is a very short-sighted policy—indeed, very bad policy altogether, to raise obstacles against their success, because some few people suffer by the change—the benefit of the many should always be regarded more than the loss of the few.

Those connected with common road conveyance, murmur against the disproportion of the duties between railroads, water conveyance, and stage-coach conveyance, which appear to be as follows:—

Railway proprietors pay for each		
passenger, only	$\frac{1}{8}$	of a penny per mile.
Stage-coach proprietors	$\frac{1}{4}$	.....
Postmasters	$\frac{3}{4}$	.....
Water conveyance.....	0	.....

According to this statement, the disproportion between the railway and stage-coach conveyance is as 2 to 1, so that the coaches pay twice as much for each passenger per mile as the railway. The objections against this partiality is no doubt just, and the tax is very burdensome, and much to their disadvantage; yet I fear the remedy proposed will not be sufficiently potent to check the progress of the disease. There is a very heavy drawback against the common road

conveyance, in the immense *debt* which the turnpike trusts have suffered to accumulate, even, be it observed, in their palmy days, amounting to upwards of the enormous sum of *nine millions** sterling, the interest of which is alone quite sufficient to destroy the hope of their ever being able to vie with railroads. And the great misfortune is, that this debt is constantly increasing, from a very obvious reason, namely, that of converting the unpaid interest into principal, upon which evidently they have interest again to pay; and if they have thus been compelled to follow this ruinous plan in their best days, how can they expect to succeed, even with duty off, when their income is reduced one-half, if not more than one-half, for we must bear in mind that their expenses still will continue undiminished.

The only chance apparently now remaining for the road turnpike trusts to maintain themselves, is, to bring to perfection the common road steam-carriages, and establish them in opposition to the railways, which, however, they cannot do, for the expense attending such carriages would be immense, and in no way tend to retrieve their difficulties; besides, to make the necessary number of carriages of this kind would require so much money, that the interest of this sum, plus that of their debt, would manifestly eat up all their profits, and leave them to meet the wear and repair of the roads and carriages as they could. Such a scheme appears to be utopian in the extreme. It is obvious that in these things the interest of the debt must be taken into consideration, because the sum will be raised by tolls, which will thus affect the carriages, &c., by whomsoever they may be put on the roads; and half a million annually in this way is a very heavy sum to be raised.

The "Times" paper, in a leading article, says, "*The*

* According to the "Report of the Select Committee on Turnpike Trusts," they have a debt of 9,000,000*l.* and upwards, which is increasing. And from the same authority, it appears that they lose annually 200,000*l.* by substituting compositions of statute labour. The interest for one year of 9,000,000*l.*, at 5*l.* per cent., amounts to the sum of 450,000*l.*, to which, adding the annual 200,000*l.* loss, as above, we have the sum of 650,000*l.* to be raised annually, from which, obviously, no advantage can be derived, as this interest must be paid to the creditors. If this sum could be expended in repairing and maintaining the roads, &c., and the duty taken off, then their chance of success would be more encouraging.

They have lost an immense deal of their traffic; they will find it difficult to keep what they have; and as to recovering what they have lost, it is hopeless.

Let the Government take the duties off, but certainly not equalize them by putting a tax on railways.

roads must become ruinous, because, if the traffic fails, the funds by which they were maintained cannot be collected."

This is precisely what I have been endeavouring to illustrate, and so it appears there is no hope, they will have both bad roads and bad debts, which will continually get worse and worse.

The editor of the same paper asks, "*What can compensate the public for the loss and inconvenience which the abolition of our admirable coaching and posting system would create throughout the kingdom.*" The fact is, the greater part of these kinds of questions are to no purpose, for posting will not be altogether done away with: railways, like roads, do not go everywhere, all over the country, and coach and post conveyances will be required to carry the passengers from the termini of the different railroads to other places a few miles distant from the railroad. This the editor recognises in respect to the London coach proprietors, for he says, "*The London coach proprietors are perhaps not so deeply interested in the change that has taken place, as they are still the carriers to and from the railways.*"

It is the country innkeepers and coach-owners, on the chief high roads, that are the great sufferers, and they, like others before them, have no alternative but to submit to the change. They have long been on the decline; since the coaches increased their speed, they have not been half so numerous as when they went slow. The numberless roadside inns have merged into four or five principal stations on the road, and now these are on the decline. That many innkeepers will be very great losers in this respect there is no doubt, which is much to be regretted in all cases; but a few suffer for the ultimate benefit of the many.

Taking the case altogether, I cannot see any chance of the coach proprietors being able to compete with the railways, for the deficit in the road accounts already exceed the means of the proposed remedy, by taking off the duty, and this decrease of the traffic will constantly get larger.

The Birmingham turnpike road accounts show that within the last two years the tolls have decreased from 28,525*l.* to 15,798*l.*, or nearly one-half, and this when the railway was scarcely yet finished. In Scotland the steam conveyance has nearly ruined the road trusts in many districts, and the same is now becoming manifest in England.

I have pointed out these disadvantages and defects of the common road system, not with any desire to magnify their losses, or deter them from any attempts to prevent their

decline, but to prevent if possible the too sanguine and almost extravagant expectations which appear to be placed on the results to be achieved by taking off the different road duties, which will end in disappointment to many who are now anxiously waiting for the realization of these expectations.

The railway system is not yet by any means in full operation, when it is we shall then hear of still farther dissatisfaction in regard to these matters. Canals will be the next to suffer, and they will, no doubt suffer very materially; but they still have the chance of carrying such traffic, especially agricultural, as the railways would not wish to be troubled with, and which may be profitable to them for some time to come. Canals have had their day; they have been found eminently useful, but modern improvements and the state of modern trade require still more rapid modes of conveyance, which the railways alone can supply.

Steam Navigation with the West Indies, Gulf of Mexico, Australia, &c. By Dr. CADETT.

TO THE EDITOR OF THE RAILWAY MAGAZINE, &c.

SIR,—In a late number of your Magazine you did me the honour of noticing a letter addressed by me to the "Colonial Gazette," and to which I regret not having had an opportunity of replying sooner, on the subject of steam navigation to the West Indies, Gulf of Mexico, Australia, &c. I feel obliged for the acknowledgment you there expressed, of your sentiments coinciding with my views therein stated, with regard to the advantages that would be conferred on the public, by the success of such a scheme; but you, at the same time, appear to dissent from that part alluding to the extension of it to Australia. Your objection would be correct if the journey would be obliged to be made without any stoppage; but as there are many islands in the Pacific which would serve for renewing fuel as well as provisions, it would not be necessary to make it a continuous voyage without stoppage from Panama to Australia. Amongst the many I may mention the Marquesas, the Society Islands, and last, though not least, New Zealand, which appears to be at present attracting a great deal of notice, and where, independent of wood, coals are said to have been found; it also lays directly in the route between Panama and Australia; to it still more than to Australia, therefore, steam communication on this line would be most advantageous, and it would greatly facilitate the New Zealand project, if such an under-

taking should be carried to maturity, and is therefore well worthy the attention of its directors and proprietors.

When any new project is first brought forward, as you are no doubt well aware, it is too apt to be viewed with prejudice and ridicule by the public, although ever so feasible; the present, therefore, cannot be an exception to the general rule; the human mind must be first familiar with a subject before it will receive it as an object.

Notwithstanding present difficulties, I look forward with confidence to no distant period when steam navigation with the West Indies, will not only be available to those immediately connected with the West Indies, and contiguous quarters, for mercantile purposes, as well as invalids, but will also be advantageous to those in pursuit of pleasure, to lovers of magnificent sceneries, and those in search of mild and genial climate, in which during the winter and spring months, no country can vie in equality with that of the West Indies. (Vide "Montgomery Martin on the Colonies.") The months of November, December, January, February, and March, are mild, and free from the excessive heat that is generally objected to, as well as from the malaria of hot regions; the public will, therefore, most likely prefer going there amongst their own countrymen, and under their own Government's protection in the winter, than to subject themselves to all the annoyances with which they meet in Germany, Switzerland, and Italy, where the beauties of nature are not half so rich as they are there, with all of which places I am myself well acquainted as well as with the enchanting sceneries of the Western world; suitable to every taste, to those admiring the bold and rocky or undulated and rich; whilst to the naturalist the beauties of the blossoms, the insects, and the feathered tribe, defy comparison with any other clime. I speak more from experience than from conjecture.

The great irregularity of the mail department to these colonies, from their being conveyed by sailing vessels, also loudly calls for this improved method of communication. I have known the packets to arrive several days after vessels heavily laden with produce, which had started at the same periods with them.

The greater facility in communication between England and her colonies, the greater will be the commerce and prosperity of both; this project being accomplished, therefore, England will be able to keep her gold within her own territories, from whence she can recall it through commerce at

her pleasure, instead of having it transmitted into the pockets of foreigners, over whom and whose commerce she has no control.

Hoping you will lend the powerful assistance of your scientific journal in the advancement of this useful object,
I beg to subscribe myself

Your most obliged and obedient servant,

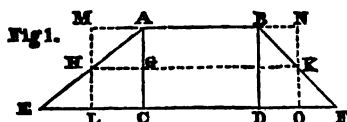
JAMES CADETT, M.D.

Colonial Club, July 1, 1839.

Computations of Earthwork. By B. H. B.

TO THE EDITOR OF THE RAILWAY MAGAZINE.

SIR,—Having observed in the Magazine of this month some observations by Mr. Lockwood regarding a new formula for calculating earthwork, it occurred to me that it was not only rather complicated, but that it did not come up to what he said, of suiting in every circumstance that might occur.



It is obvious that the area of the section $A E F B$ is = the depth $A C \times H K$, a line drawn parallel to $E F$ through a point G in the centre of $A C$; although this is almost

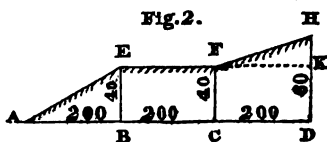
apparent it may be useful to give the demonstration. The triangles $A G H$ and $A C E$ being equiangular, and $A G$ being $= \frac{A C}{2}$, then $H G = \frac{E C}{2}$, $= M A$, or $E L$; now $M A$ being =

$E L$, and $M H = H L$, and $A H M$ and $E H L$ being equiangular, then they are equal, therefore the parallelogram $M A L C$ = the triangle $E A C$, and for the same reason $B N O D = B D F$, therefore the section $A B F E = (M A + A B + B N) \times A C$; now supposing that m represents the ratio of the slope of the left hand and n that on the right, x = the depth $A C$, and a the top of the embankment $A B$, then $M A = \frac{m x}{2}$ and $B N = \frac{n x}{2}$, therefore $(A B + M A +$

$B N) \times A C = \left(a + \frac{(m+n)x}{2}\right) \times x$; now taking as Mr.

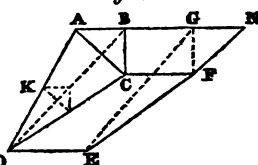
Lockwood did $x = 40$, $a = 30$, $m = 3$ to 1, and $n = 2$ to 1, then $\left(a + \frac{(m+n)x}{2}\right) \times x = \left(30 + \frac{(3+2)40}{2}\right) \times 40 = 130 \times 40 = 5,200$. This formula, though the same in principle with that of Mr. Lockwood, is I think a much simpler

expression. But a much more frequent cause of error than the above is when calculating earthwork of unequal height; for instance, take the following section (although it is impossible that ground should be so regular, it can generally be appropriated to similar forms).



Now the ordinary mode of calculating this, is to multiply the length by the average depth and by the average breadth as found by the rules aforesaid, but this applied to the first part AEB is false, for the side parts of the section are not wedges, but pyramids, as may be seen from the following rough perspective.

Fig. 3.



It is evident that the side part $ABCD$, fig. 3, is a pyramid, although the centre part $BGCFDE$ is a wedge; now the area of the side piece taken at the centre K is only a quarter of the area at the base ABC , while the solidity of a pyramid is the length multiplied by $\frac{1}{3}$ of the area of the base, now $\frac{1}{3}$ being $= \frac{1}{12}$ and $\frac{1}{3} = \frac{4}{12}$, it follows that the true solidity of the side piece is $\frac{1}{3}$ more than that generally taken. The ordinary method of calculation applied to the centre piece $EFCB$, fig. 2, is perfectly correct, but its application to $GDEH$ is again false; here the ordinary mode will first have to be used, and then an allowance $= \frac{1}{3}$ of the solidity of the side pyramid FHK left above the level of F . The amount of error involved by this will be better observed by reducing it to figures; let us suppose that in the section, fig. 2, the breadth at bottom is 30 feet, and the slopes on both sides = 2 to 1, then the ordinary method will give the calculation as follows:—

	Length.	Average depth.	Average breadth.	
AEB	$= 200$	$\times 20$	$\times (30 + 40)$	$= 280,000$
$EFCB$	$= 200$	$\times 40$	$\times (30 + 80)$	$= 880,000$
$FHDC$	$= 200$	$\times 50$	$\times (30 + 100)$	$= 1,300,000$

Total according to ordinary mode, 2,460,000

Additional allowance on 1st part AEB :—

$$200 \times 20 \times 13\frac{1}{3} = 53,333$$

Ditto on $FHDC$ $200 \times 10 \times 6\frac{2}{3} = 13,333$

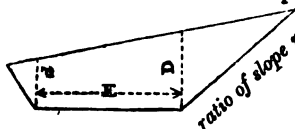
666,66

True total, 2,526,666

Thus, in this case, the error amounts to about $\frac{1}{10}$ of the whole sum.

Mr. Lockwood says that it would be tedious to investigate a proper mode of calculation when the ground inclines, and that the best way is to allow a per centage; now in this I differ very materially, as I think a great many errors arise from this mode of calculation. The ordinary method is to take the area of each cross section by measurement, and multiply the mean of each two cross sections by the length between; now this I think very injudicious, as cross sections are generally taken at equi-distant points, without particular observation as to whether the ground between is perfectly uniform or not, besides being liable to the same error of not considering the side pieces as pyramids or frustums. The method which I would recommend would be to calculate the quantities by the rules above given, as if no such things as cross sections existed, and then when this is completed, take on each cross section by measurement the difference of the area from what it would have been had the ground been level across, then multiply the mean difference of each two cross sections by the length between, and add or subtract from the original calculation as the case may require. I may mention that I have employed these methods very extensively in a number of calculations I have lately made, and after a little practice found them far from tedious, besides being very correct.

As it may sometimes be necessary to get the exact area of a cross section on sloping ground, the following formula may be found useful, the letters apply as marked on the



sketch: $\left(\frac{r E d^2}{2r(D-d) + 2E} \right) + \left(\frac{r E D^2}{2E - 2r(D-d)} \right) + E \left(\frac{d+D}{2} \right)$

Hoping from the importance of the subject and the want of good information upon the point that you will give these hurried observations a place in your valuable Journal,

I remain, Sir, yours respectfully,

Edinburgh, 5th July, 1839.

B. H. B.

The Government and Kyan's Anti Dry-rot.

FROM the many and, in our opinion, decisive experiments made by men of undoubted skill and veracity in this and

other countries, on the efficacy of Kyan's process for preserving timber from the effects of dry-rot, we have uniformly advocated the principle. Indeed it is now admitted by all men whose opinion is worth listening to, that when applied of sufficient strength, and with proper hydraulic pressure, as the company use it, it penetrates and preserves every part of the wood, whatever be its nature or substance. We have heard of the most infamous frauds in using it, by the servants of parties who have obtained licenses. It is no uncommon thing for men employed to receive the full quantum of material of the company, sell a portion of it, divide the plunder among themselves, and use the solution consequently of a much inferior strength. We believe this has happened on more than one of our leading railroads. But wherever Kyan's process has been applied as it ought, we have not heard a single instance of want of perfect success, and it is now in almost universal use in those great works. For some reasons, however, best known to one or two individuals, it has not made its way into our Admiralty, though it has into the Ordnance. But of all the Government offices we believe the Admiralty is not one in which patronage, protégéship, humbug, and jobbing thrive the least luxuriantly. If indeed one or two officials and employées in that department could be taught the way out, as they have found the way in, it is generally believed the country's interest and the Admiralty's honour would not materially suffer. The following excellent article on this subject we copy from the "United Service Gazette," which we doubt not will open the eyes and enlighten the understandings of many who have been inclined to distrust Kyanizing on account of the Admiralty's not having adopted it :—

"We must frankly admit that we are no great friends to joint-stock companies of any kind. So much of fraud, humbug, and chicanery have been practised upon 'John Bull, by bodies of swindlers incorporated under that sweeping designation, that we have learned to look upon all discoveries which are ushered into public notice under their auspices with considerable suspicion. For this reason we were somewhat slow to investigate and report upon Mr. Kyan's process for the preservation of timber against the ravages of dry-rot; and it was not until our attention had been directed by several valuable correspondents to its merits, that we were induced to give an attentive perusal to the documents on which its claims to success are chiefly founded: when we lost no further time in doing justice to its merits.

"A letter which has been addressed by the Secretary of the

Anti Dry-rot Company to Lord Minto, in reply to the slur which that 'humble instrument of eleven naval administrations, Whig and Tory,' Sir John Barrow, appears to have been directed to cast upon the discovery, is now before us; and we must say, that more complete proofs than it appears to us to contain of the efficacy of the process, have never, to the best of our knowledge and belief, been brought forward in favour of any similar discovery. After a trial of ten years, by the Board of Admiralty, of Mr. Kyan's process, one-half of which period his prepared timber has entirely withstood decomposition in the Fungus Pit at Woolwich, it seems difficult to understand the possibility of impugning its usefulness. But it is with Mr. Kyan's solution, as we believe it to be with Mr. Harris's lightning conductors, and many other useful inventions; their lordships have got some pet *protégé* to job the thing for his own benefit in another way. But whose fault is it that the anti dry-rot composition has not been tested to an even greater extent? (although we can hardly understand what more could be expected from it.) The Board of Admiralty might have convinced themselves more fully of the efficacy or inefficacy of the discovery, either by building a vessel wholly of Kyanized wood, or by a comparative experiment in building a ship partly of Kyanized wood, and partly of unprepared timber. All applications on the part of Mr. Kyan to be subjected to such a test, however, were pertinaciously refused by their lordships.

"On the first trial in the fungus pit at Woolwich, in 1828, it was earnestly requested that a cube of *unprepared* wood from the *same piece of timber* as that which was Kyanized, should be placed along with it in the pit, in order that a comparison might be instituted between them; but this was *refused*, on the ground that it was the general opinion of the persons who constructed the fungus pit, and had the superintendence of the experiments made in it, that *no* unprepared wood which had been subjected to nothing beyond the ordinary process of seasoning, could resist its decaying effects, and that, consequently, a comparison was unnecessary. In 1830, Mr. Kyan applied to the Admiralty to be allowed to inspect the cube of prepared oak which he had deposited in the fungus pit two years before; but as the Admiralty did not consider it ought to be examined until it had remained there *three years*, he waited until 1831, when a report from the Navy Office pronounced it to be perfectly *sound*! In December, 1831, Sir Robert Seppings made a similar report of its condition to Sir James Graham. In July, 1831, this identical cube of oak was taken out of the fungus pit, and left exposed to atmospheric air, under the custody of the Government officers, until September, 1832—a period of 15 months. It was then replaced in the pit, in order that it might be seen if the alteration of the circumstances had diminished the effect of the process. On the 19th February, 1833, the fungus pit was again opened, in the presence of Professor

Faraday, J. G. Lockhart, Esq., William Farrell, Esq. (an eminent architect), and several other scientific gentlemen; when the cube of oak, and all the other prepared timber, including some canvass and calico which had been deposited along with it, were found to be perfectly sound; whilst the wood which had undergone no other than the ordinary seasoning, was proved to be in rapid state of decomposition. In July, 1833, a further inspection of the pit took place, when, after *five years'* immersion, the Kyanized log was found to be as sound as when it was first put in. Nay, that it might be submitted to every test to which it was possible to subject it, it was split into three pieces, in the presence of numerous officers of the dock-yard, and found to be in 'a healthy state' (we quote the words of a memorandum signed by seven officers of the yard, including Captain Warren), 'perfectly free from insects, and from any appearance or symptoms of dry-rot.' Now, one would think that, after tests so severe, authenticated by their lordships' own officers, it would have been impossible for them to withhold any longer their admission of the efficacy of the process. Not only have they done nothing of the sort, however, but they have resisted other testimony equally conclusive; whilst they have seized with evident avidity the fact that some *iron bolts* of the Samuel Enderby, which had been corroded, it was said, by the solution; overlooking the fact of the perfect state of preservation of the copper bolts, the non shrinking of the timbers, and, what was of equal importance, the extraordinary health of the crew and the sweetness of the bilge water. It turned out eventually, however, that the corrosion of the iron bolts had been no more occasioned by Mr. Kyan's process, than the Goodwin Sands had been caused by the erection of Tenterden steeple; and of this fact, the appendix to the letter which has given occasion for these remarks, contains the most conclusive evidence.

"One of the leading objections to the process, and one which had, we confess, made an unfavourable impression on our own minds, appears to have been satisfactorily removed. We allude to the statements of its opponents, that the solution does not penetrate the timber more than an inch or two beyond the surface. So far from this being the case, we are assured that, by the application of hydraulic pressure, timber of any dimensions may be saturated throughout in the course of twenty-four hours.*

"We have thus an invention of the utmost importance to this maritime country;—one which has been tested for upwards of ten years, and its efficacy established, not only by experiments made under the superintendence of their own officers, but under that of some of the most eminent chemists, physicians, professors,

* It is true that the borer and pin-worm have occasionally attacked the prepared timber; but it has been proved to demonstration, that the process practically prevents the dry-rot. But, supposing the case were otherwise, Mr. Kyan does not, like Dr. Morison, propose to cure all sorts of diseases with the same specific.

architects, and engineers of the age;—slighted and discouraged by the Admiralty for no other reason in the world than to enable a certain official personage, who would have the public believe he has discovered a better plan, to reap the benefit so stoutly contested for, and so hardly earned, by Mr. Kyan. And yet, after waiting patiently the result of every trial; the failure of all other plans making any pretence to the same results; and the testimonies in its favour of a large body of the most scientific men of the age; fresh discouragement and a pertinacious denial of those further means of proving its efficacy, which would increase the favourable impression which already prevails respecting it, has been opposed to it on the part of the Admiralty, with the corrupt view of putting the money which ought to be paid to Mr. Kyan and his co-partners, into the pockets of one of their own brother red-tapists.

“We gather from Mr. Morgan's letter to Lord Minto, that beside having been the subject of public lectures at different institutions, by several of the most eminent men of science of the age, and having been patronised by every architect of eminence in the country, (including Sir Robert Smirke, Mr. Decimus Burton, Mr. Barry, and Mr. Wilkin,) it is used on the following vast undertakings with the express sanction of their respective engineers:—

“ Railways.			Engineers.
London and Birmingham	...	...	R. Stephenson, Esq.
Great Western	...	...	J. K. Brunel, Esq.
North Midland	...	...	G. Stephenson, Esq.
Manchester, Bolton, and Bury	...	...	J. Hawkshaw, Esq.
London and Croydon	...	...	Joseph Gibbs, Esq.
Liverpool and Manchester	...	...	G. Stephenson, Esq.
London and Southampton	...	...	J. Locke, Esq.
Ulster, York and North Midland	...	...	G. Stephenson, Esq.
Newcastle and North Shields, &c.	...	...	— Nicholson, Esq.
Midland Grand Junction	...	...	W. D. Holme, Esq.
York and North Midland	...	...	Thomas Cabry, Esq.
London and Greenwich	...	...	Colonel Landmann.
Dublin and Kingston	...	...	Charles Vignoles, Esq.
Birmingham and Gloucester	...	...	Captain Moorsom.
Maryport and Carlisle	...	...	G. Stephenson, Esq.
Llanelly	...	...	Alfred Thomas, Esq.
Birmingham and Derby	...	...	{ G. Stephenson, Esq.
			{ — Birkenshaw, Esq.
Ulster	...	...	— Godwin, Esq.

“We are unable, in the limited space to which we are compelled to restrict ourselves, to do more than allude to the numerous and convincing documents which are appended to Mr. Morgan's letter; but we cannot refrain from referring to the testimony of that distinguished architect, Sir Robert Smirke, who, after subjecting logs of Kyanized wood to every test which suggested itself to him, for the purpose of decomposing them if susceptible of

decay, says, in his evidence before the Committee on Timber Duties, 'This preparation of Mr. Kyan's *resists all rot*; I CANNOT ROT IT!' The success of the repeated trials the process has undergone in Holland, attested by the report of the Dutch Government on the subject, ought to have removed any lingering doubt from the minds of the people of the Admiralty, and must have done so long ago, had they no sinister objects in view; but it is clear that there is more than at present meets the eye, in their obstinate refusal to do justice to Mr. Kyan's invention.

"But, important as the object that it proposes, with moral certainty, to achieve, really is, the saving which would of necessity accrue to the public service by the adoption of the process, is of still greater consequence, as will appear by the following official statements, exhibiting the proportionate expense of repairs and building in the navy, in consequence of the decay of timber:—

"Navy Office, 27th April, 1814.

"A List of Ships of the Line built in Private Yards, or by Contract, specifying the Name of each Ship, Number of Guns, when built, Contract Price of the Hull, Time of Service at Sea before being docked, and Cost of Repairs.

Ship's Name.	Guns.	When built.	Contract Cost of Hull.	Time of Service at Sea before being docked.	Cost of Repairs.
			£.	Yrs. Mths.	£.
Northumberland . .	74	1798	37,456	5 1	59,795
Superb	—	—	38,647	2 6	55,292
L'Achille	—	—	38,450	1 5	25,646
Ajax	—	—	39,039	5	26,683
Kent	—	—	36,031	7 1	88,357
Dragon	—	—	36,181	6 1	34,200
Spencer	—	1800	36,249	2 9	124,186
Conqueror	—	1801	34,827	3 11	22,444
Sceptre	—	1802	35,931	5 4	11,118
Albion	—	—	35,239	8 4	102,295
Illustrious	—	1803	37,592	4 6	74,184
Eagle	—	1804	37,760	4 5	52,536
Swiftsure	—	—	34,909	3 1	14,076
Marlborough	—	1807	61,256	3	29,394
Sultan	—	—	61,299	5 4	61,518
Elizabeth	—	—	60,503	1 4	39,531
Egmont	—	1810	57,438	2 3	29,747
Poictiers	—	—	58,329	2	44,498
Stirling Castle	—	1811	58,329	2	65,280
Edinburgh	—	—	58,329	2	52,476
Gloucester	—	—	58,329	2	43,268
Mulgrave	—	1812	58,329	2	54,680
Benbow	—	1813	58,329	2	37,166
Total			£1,068,781		£1,148,370

" Estimate for the Charge of Building and Repairs of Ships in His Majesty's Navy, from 1800 to 1820.

Year.	Building.	Repairs.	Ordinary Wear & Tear.	Total each Year.	
	£.	£.	£.	£.	
War.	1800	399,170	230,960	227,549	857,679
	1801	506,290	233,640	227,840	967,770
	1802	340,350	319,970	252,040	912,360
	1803	422,860	376,790	255,360	1,055,010
	1804	406,810	433,500	198,340	1,038,650
	1805	641,290	833,970	216,760	1,692,020
	1806	1,677,440	238,040	254,750	2,170,230
	1807	1,528,970	517,779	271,805	2,318,554
	1808	1,564,344	689,054	270,929	2,524,327
	1809	1,503,729	679,267	354,214	2,537,210
Peace.	1810	1,073,734	652,079	358,684	2,084,497
	1811	1,304,019	546,958	403,360	2,254,337
	1812	1,138,504	447,995	275,316	1,861,815
	1813	1,984,772	612,916	432,518	3,030,206
	1814	907,038	774,622	430,671	2,112,331
	1815	680,089	1,006,762	462,242	2,149,093
	1816	645,249	920,082	535,589	2,100,920
	1817	569,033	570,244	364,625	1,503,902
	1818	664,240	570,750	310,000	1,544,990
	1819	763,620	381,810	310,000	1,455,430
Total for 20 Years.	£18,721,551	£11,037,188	£6,412,592	£36,171,331	

"It thus appears that twenty-three ships-of-the-line cost the nation in building 1,068,781*l.*; and in less than four years, 1,148,370*l.* to repair them! From 1800 to 1819 the nation paid 18,721,551*l.* for building ships; and the enormous sum of 17,449,780*l.* for their repairs and ordinary wear and tear. It may be true that the whole of these repairs did not arise from decay of timber; but if we put the estimate for natural decay at one-half that sum, upwards of eight millions would have been saved to the country had Kyan's process been known and in use at the time; not to mention that the immense loss of timber which takes place during the process of seasoning would have been averted; as, whilst the time occupied by Kyan's process is not more than one-third of that required for seasoning timber in the ordinary way, and the sap-wood as completely preserved as that of any other part, a further saving might have been effected. On the other hand, the expense of Mr. Kyan's mode of seasoning would not exceed, including *materiel* and machinery, two per cent.

"The Board of Admiralty is not required to commit itself rashly in point of judgment, or improvidently in point of expense. As regards the first, it has for examples the Board of Ordnance, the Commissioners of Woods and Forests, hundreds of nobility

and gentry, the most eminent architects, engineers, and others. In reference to the expense, the directors seek not to obtain from the Admiralty any large sum for the use of the process. By an arrangement similar to that entered into with the Dutch Government, the Board of Admiralty would only pay a small fee for the use of the invention, in proportion to the quantity of timber they would prepare; and, as has been already shown, that the whole expense will not exceed, inclusive of a fee to the company and cost of material, ten shillings per load, the Admiralty providing itself with hydraulic presses.

"Now, if in addition to all these facts, it be correct, as we are assured it is, that no single instance of failure has ever yet been pointed out, (and from the fact that durability of merchant-ships is not considered very desirable by their builders, however much so it may be to the owner, the process has many sturdy, if not disinterested opponents), it is difficult to conceive any honest pretext on the part of the Admiralty, for the lukewarmness and discouragement they have evinced towards Mr. Kyan's discovery. Motives of some kind, and those sufficiently strong, they must clearly have for their conduct; but having countenanced that flippant hack Sir John Barrow, in a sweeping attack upon it, the least they can do is to allow those interested in its success to prove to them by no more suspicious testimony than the evidence of their own servants, illustrated by facts not to be gainsaid, the almost infallibility of the process.

"It is not often that we enter as much at length as we have here done into questions of mere science; but having waited until such time as proof multiplied on proof, of the efficacy of this process, to such an extent as to render scepticism unfair to those interested in its success, and prejudicial to the public, we have not hesitated to record thus deliberately our opinion on the subject. The Dutch Government appears to be so perfectly satisfied with the various experiments which have been made in Holland, that the process is now in use in every dockyard in that kingdom; and we shall be much surprised if the force of public opinion (of which, heaven be thanked, they do stand in some awe), will compel our own truckling Naval Administration to order its equally universal application in this country. Until so coerced, however, Mr. Kyan and his copartners have little to hope for at their hands."

RAILWAY SYSTEM FOR PASSENGERS' TICKETS.

A VERY ingenious system has been invented by Mr. Edmonson, chief clerk in the Manchester and Leeds Railway booking-office, to prevent frauds on the part of passengers and company's servants, and to keep the accounts. By it 110 attempts at fraud were prevented in one day. From a very verbose description of it in the "Manchester Guardian" we extract the following:—

" The tickets are small, stiff cards, each having printed on its face the place of the passenger's destination, and an intimation that the passenger is to show the ticket to the company's servants if required. Each ticket also bears at one end some small embossed figures, which constitute its progressive number. The face of each ticket, for whatever station, is white; and on one end is legibly stamped the date of issue. The *back* is of a different colour for each station. Those for passengers to Manchester are pink, or rose-colour; and those hereafter to be used for passengers to Leeds are to be white. Those for Mill's Hill (Oldham or Middleton) have blue backs; those for Rochdale, green; and for Littleborough, yellow backs. The tickets for passengers at any station going *towards Leeds* have engraved on the back the representation of a fleece; the tickets for passengers from Leeds, or any intermediate station, *towards Manchester*, have the representation of a bale of cotton. To distinguish the tickets of the three several classes of conveyance, those for the first-class carriages have plain backs, except so far as we have already described; the second-class tickets have several horizontal lines drawn along the back; and those of the third-class have the back divided by perpendicular and horizontal lines into small squares, or what may be called a checked pattern. Thus, no one, by any addition, such as ruling lines or checks on the back of his ticket, can convert a third-class ticket into one for the second or first-class carriages; any such addition only reducing the value of the ticket. The lines and checks, being open, do not interfere with the distinctness of the engraved fleece or cotton-bag, as the case may be; and the use of all these is to enable the guards collecting the tickets to discriminate, without having the trouble of reading them, the tickets of one station and of one class of carriages from those of the other stations and carriages. This ingenious gentleman has also constructed a small printing-machine, which prints the face of the ticket in the usual way, embosses a progressive number on each ticket, being for this purpose a self-acting machine, and prints many thousands without a renewal of ink; and this done, it deposits the tickets in a pile, in the order of their progressive numbers, ready for transference to the tubes, which are of wood, resembling in form the wooden rain-spouts of houses. Each tube contains 500 tickets, which are pressed upwards by a spiral spring in the bottom of the tube. The present number of stations, or stopping-places on the line, being three from each end, and the classes of conveyance three, there are nine of these tubes used for each departing train. They are let into a sort of desk, somewhat resembling an ascent of three steps; and this desk forms a part of the counter at which passengers apply for tickets, but is not visible to persons outside the counter. The heads of the nine tubes are arranged so as to be under the right hand of the ticket-clerk; the three tubes nearest him are those containing the Mill's Hill tickets, an inscription on blue

paper over them specifies and distinguishes them, the nearest being that for the first-class carriages, the second for the second-class, and the third for the third-class. The next three, in similar order, under a green label are for Rochdale; and the other three, under a yellow label, are for Littleborough.

When the whole of the line is opened, and there will be perhaps twenty stopping-places between Manchester and Leeds, there will consequently be required sixty of these tubes, which may be so arranged in steps or tiers, one above another, as all to be comprised within a very small space. The top of each tube has a half-lid, on hinges, which, being turned back, discloses the uppermost ticket, at least that end of the card which shows its progressive number. Inside the lid is inlaid a small piece of slate, on which the progressive number of the uppermost ticket in each tube is copied before commencing to supply tickets for the next departing train. When the doors of the office are closed for that train, the number on each little slate, deducted from the progressive number on the then uppermost ticket in the tube, gives the number of passengers for each station, and by each class of coach. This plan affords remarkable facilities for making up the waybill, which only needs nine entries, corresponding with the nine results obtained from the tubes; and at the departure of the six o'clock evening train, we observed that the number of tickets gone from each tube was ascertained, and the waybill made out in forty seconds, though all the third-class tubes exhibited a large number of passengers.

We have still another ingenious instrument to describe. It stands on the counter before the clerk, and is a small printing machine (in neat mahogany frame), for dating the tickets; which operation is performed by just pushing the ticket into a crevice in the machine, and drawing it out again instantly. This little machine, the principle of which, though great ingenuity is displayed in its adaptation to the purpose, is extremely simple, is also the invention of Mr. Edmondson, and does great credit to his mechanical talent. By means of this little machine, every ticket is stamped with the month and day of the month on which it is issued; this printing being performed with great rapidity by the ticket-clerk, and no ticket being printed with this date till it has been asked for by a passenger. The operations of the single clerk, who supplies all the tickets for a crowd of passengers, prints the date on each ticket, receives the money, and gives the change for gold, &c., are all conducted with the greatest apparent ease, and without any confusion or loss of time. With his right hand he draws the ticket from its tube, pushes it into the dating-press, and throws it on the counter; while with the left hand he receives the amount of fare, which he places in bowls before him. In this way nearly a thousand tickets were supplied over the counter, chiefly by this single clerk, during Thursday last, with less bustle or confusion, and certainly in much less time, than half the number

could have been issued in the mode ordinarily practised in the booking-offices of railways.

Again, each station has a waybill, which is a piece of stiff pasteboard, printed in a tabular form, in nine divisions. This waybill slides in a groove in a wooden case, and is protected in front by a thin sheet of talc, so that the waybill may be read by the guard on the road in wet weather, without being defaced or injured by rain or snow. There are six of these cases or slides attached, much as the leaves of ivory tablets are secured together, so that one series of them serves for a train from leaving Manchester to its return to this station, which is the head office, and to which all the returns are made. The number of tickets issued, and the number of tickets returned by the guards, are entered in a book, and compared the following day with the summary from each station; and thus a system of check and counter-check is maintained with the least possible amount of bookkeeping, and certainly with very much less trouble and loss of time than must ordinarily attend the keeping of railway passengers' accounts.

There are several other contrivances by which this system is fully carried into every department of the company's operations. One very striking feature of the system is the absence of that great number of books of tickets, registry, &c., which are generally required by railway companies. The tickets, the waybills (which, instead of large, complicated sheets, are small strips of card), the station summaries, and one small book in which the number of tickets for each train are entered from the waybills, are the only substitutes for all the usual day-books, &c. The clerk, on receiving nine tubes, each supplied with 500 tickets, is debited with the whole amount, as if they were so many bank notes; and of course he is credited with the amount of cash received by him and paid over,—the cash being balanced after the departure of each train.

RAILWAY OPENINGS.

Manchester and Leeds Railway.—We gave in our last an account of an experimental trip of the directors over the portion from Manchester to Littleborough, 16 miles, which it was intended shortly to open. On the 3d of July, the directors having invited the directors of "the Liverpool and Manchester, the Grand Junction, the Manchester and Birmingham, the Manchester and Sheffield, the York and North Midland, the North Midland, the Leeds and Selby, and the Hull and Selby Railways," and, accompanied by Geo. Stephenson (principal engineer), — Gooch (acting engineer), J. B. Brackenbury (law clerk), and John Jellicorne (secretary), Esquires, with Capt. Laws, R.N., superintendent, and a vast assemblage of ladies and gentlemen, amounting in all

perhaps to 550, set out in two trains shortly after twelve, to make a formal opening of the part from Manchester to Littleborough. The following account we have abridged from the "Manchester Guardian" of July the 6th, which contains an elaborate and interesting account of the whole proceeding:—

"There were two trains for the conveyance of the directors and their numerous visitors. The first consisted of eleven carriages drawn by two engines, in the following order:—The "Stephenson" engine, then a tender, and behind it the "Kenyon" engine; both of these engines being supplied from the manufactory of Messrs. Robert Stephenson and Co., Newcastle-on-Tyne. There was no effort or attempt to go at any considerable speed; the object of the directors being rather to enable the company to see the nature of the line, and the pleasing country through which it passes, than to whisk them along at a rapid rate. Consequently, the rate of travelling was not more than about three minutes per mile, or twenty miles an hour. The first train slackened speed in passing the vitriol works of Messrs. Hannibal, Becker, and Co., at Fox-denton; and at the village, a great number of people were collected to witness its progress; and they, as elsewhere, cheered the progress of the locomotives along their new domain. The three miles from the second to the fifth mile-post, were traversed in about $8\frac{1}{2}$ minutes; and the Mill's Hill station, distance $5\frac{1}{2}$ miles from Manchester, was reached at 22 minutes before one o'clock, or in about 16 minutes from starting. After leaving Mill's Hill, crossing the Irk, on an embankment and double culvert, and the Rochdale Canal at Three Pits, in rising the incline towards its bridge over the Heywood Branch Canal, where the heaviest gradients occur, being from $34\frac{3}{4}$ to $40\frac{1}{2}$ feet per mile, the speed of the train sensibly slackened (four minutes and a-half being occupied in traversing one mile), and at length, after a few expiring *snorts* of the engine, it came to a dead stop about seven miles and a-half from Manchester."

The cause of this was afterwards found to be the complete choking of the engine with mud from the foul water used. Hence the engine became useless, and the power of the other, the "Stephenson" engine, being unable to draw the weight up the incline, a delay occurred, until the second train arrived. The two trains then joined, and after a long delay on this account, and another at one of the stations to take in coke and water, about two minutes before two o'clock, the train passed through the station-house, nearly opposite the church at Littleborough; and the company noticed, with no little apparent satisfaction, two long ranges of sideboards, loaded with all the materials of a substantial collation. The train did not stop here, but proceeded about a mile further, to the entrance of a noble stone arch, shaped out of the rock, having on the pediment above what would be the key-stone of an ordinary arch, the armorial bearings of the towns of

Manchester and Leeds, carved in relief, and blazoned per pale, on the same shield, with the date, 1839. This point, between fifteen and sixteen miles from Manchester, was reached about four minutes after two o'clock.

Precisely at three o'clock the party sat down to the collation, after which toasts, speeches, &c., flowed in quick succession. High, and we believe well-merited, eulogiums were paid to the judgment, skill, and persevering activity of the directors and officers. In returning thanks for the drinking of his health, the chairman, James Wood, Esq., touched very piquantly on the opposition and croaking parties they had encountered. In their first application to Parliament they had been thrown out by Members coming down and voting against them, who had never heard one particle of the evidence. On the second application, the croakers proclaimed they might apply, but they would never obtain their Act. When it was obtained they predicted again, that though they had succeeded so far the directors never could have the courage, the boldness, the hardihood, to commence the works. But finding them commenced, and two predictions falsified, they knew not what to do. At length they hazarded the last fragments of their professional reputation on one cast more, and boldly pronounced, that though the directors had been rash enough to begin, they never could complete. This day, however, had decided their infallibility here, and the honourable chairman supposed, their character as prophets respecting the Manchester and Leeds Railway was gone.

At 5h. 17m. the first train started on its return, and at 6h. 15m. reached Manchester. The day throughout was exceedingly fine, and amidst the many thousands assembled not the slightest accident occurred.

To the account from which we have taken the above, the "Manchester Guardian" adds a sketch of the progress made since obtaining the Act (for a description of the line, carriages, &c., see our last, p. 408), from which we extract the following:—

"The amended Act was passed in May, 1837, and immediately afterwards the directors proceeded to let the contracts for that portion of the line which was opened on Wednesday last. The whole distance between Manchester and Littleborough was let in six contracts, none of which have changed hands; and we are glad to hear, that all the contractors have done their respective portions of the work with credit to themselves, and to the satisfaction of the directors and engineers of the line. We have already, on former occasions, noticed the viaduct at the St. George's-road station; and we will only add here, that the whole of the work in this contract is highly creditable to Mr. John Brogden, the contractor, who, in spite of many obstacles, has accomplished this great undertaking within the time specified for its completion. Perhaps the arch over Livesey-street is the one most worthy of

notice; it is elliptical, of 42 feet span, of brick with stone quoins. A little beyond this viaduct, on the left or west of the line, is the locomotive engine-house, a spacious circular building, in course of erection by Messrs. Bowden and Edwards, of this town. Passing to the Littleborough station, we may observe that it stands on a viaduct of considerable height, having a flight of stairs up the side of the viaduct, with booking-offices, waiting-rooms, &c., below the level of the line.

"The ground was first broken on the 18th of August, 1837, and the contracts from Manchester to Littleborough have been in operation on an average no longer than *nineteen months*, a striking proof of the unprecedented rapidity which has been manifested in the execution of the works. It may be recollected that the directors, in their early reports, named May, 1839, as the time when they expected to open the railway to Rochdale, a distance of ten miles. It will, we think, be acknowledged, that they have more than fulfilled this promise, by opening the line from Manchester to Littleborough, a distance of fifteen miles, on the 3d of July. As will have been seen by the statement of Mr. Gill, we understand there is every reason to believe that the further intentions of the directors will be vigorously carried out, and that this important line will be opened throughout within the next year, 1840.

"We are glad to learn, that the number of passengers on the line on the first day, Thursday, was upwards of *three thousand one hundred*. Yesterday the number, we believe, was not so large."

REPORTS.

GLASGOW, PAISLEY, AND GREENOCK RAILWAY.

General meeting, held July 5th, ROBERT DOW KER, Esq., in the chair.

REPORT.—During the six months that have elapsed since the proprietors were last assembled, the progress of the railway has been fully commensurate with the anticipations of the directors; and the present state of the contracts tends to confirm them in the hope they had ventured to express in former reports, that the whole line would be ready for the traffic next summer.

The directors have periodically visited every part of the road, and have satisfied themselves by personal observation, that strenuous efforts are making to accomplish this. The detailed progress of the different works will be gathered from the subjoined report of the acting engineer, Mr. Errington.

The board has been compelled to avail itself of the power provided in all the deeds of agreement with contractors, to re-let a small portion of the excavation near Greenock. The directors regret having been obliged to adopt this course, but the very dilatory proceedings of the contractor left them no alternative. The party who has succeeded to the work is rapidly regaining the lost time, and the anxiety which began to arise, lest a comparatively insignificant amount of cutting should retard the opening of the whole line, is now dispelled.

With one or two trifling exceptions, the whole of the land is now in the

hands of the contractors, and large payments have been made to account. In some cases it is agreed that the damage shall be fixed when the railway is completed, and, in many instances, the arbiters, to whom the settlement of disputed value was mutually referred, have as yet given no award. In one case only have the company proceeded to trial, in order to obtain possession; and the directors lament that this proceeding should have been forced on them by the corporation of Paisley. The sum tendered was 1,650*l.*, and the jury, by a majority of one, found the railway company liable in 1,660*l.*; thus virtually confirming the sufficiency of the offer, but burdening the railway with all the expenses of the inquiry. The directors are at a loss to comprehend the principles on which the jury have thus visited the consequences of the opposition on the party whose judgment they have affirmed.

The following is the joint-committee's statement:—

"The committee of management, for the joint-line between Glasgow and Paisley, have pleasure in reporting that all the works under their charge are in a state of great forwardness, and they beg to refer to their engineer's report as an evidence of this, and also as a proof that no exertion is being spared to hasten the completion of the railway.

"Their last contract, which carries the line from the outskirts of Tradeston to the immediate vicinity of the Glasgow bridge, was let on the 16th May to a contractor of known character, and whose work on another part of the line is giving satisfaction. This length consists of bridges over the various streets, and a long extent of walling and arching; and it is satisfactory to add, that the sum at which it has been taken tallies very closely with Mr. Locke's original estimate, and on which the calculations of the committee were based.

"The whole of the land is acquired, and every building in Paisley. All the properties in Tradeston required by the committee will shortly be on their possession.

"It is impossible to state with accuracy, at present, the exact expense under this head, because, in many instances, a sum has been consigned at the sight of the arbiter, to meet the award, and this may or may not, prove sufficient. The committee have also occasionally considered it politic to buy the whole of small properties which were very materially damaged by the railway, and the value of the remaining portions of these will fall to be deducted.

"They have also, in one case, to the south-west of Paisley, and adjoining the town, purchased a considerable space of ground. It will be remembered that the two railways diverge at this point, and for a considerable distance form a very acute angle. The ground between the lines (the railways being on embankments) was so much injured that the damage done to it would have nearly equalled the value, and the committee, therefore, at the request of both boards, have agreed for the whole. They were confirmed in their judgment by the fact, that this ground will enable the two companies to make a new connecting link, by which means traffic from Ayrshire and Greenock may be carried along the respective lines without entering Paisley. It will also be very useful for erecting repairing shops, &c. The extent of it, exclusive of that part occupied by the railways, is about 3½ acres; and it is left to an amicable arbitration to decide what proportion of the expense shall be borne by each company.

"Much progress has been made in laying out the joint stations at Glasgow and Paisley; but the committee is in possession of several plans for this purpose, and their attention has been for some time directed to the subject. The various interests to be considered render it a work of time and care.

"The committee have only to add, that their constant endeavour is (consistent with economy), to open their line earlier than expected, and in this desire they are cordially assisted by the engineers and others intrusted with the duty of carrying out their orders."

The situation of the station at Greenock is of the deepest moment to the complete success of the railway. The public convenience, and hence the interests of the shareholders is consulted by bringing the terminus into Cathcart-street, immediately facing East Quay-lane, instead of stopping short at Bogle-street, as contemplated, and the station is at the same time brought into a much better position as regards the Steam-boat Quay, and within two minutes' walk of it. The advantage thus obtained will entail some additional expense, but its great superiority must at once be evident to all acquainted with the localities.

The directors, in their last report, alluded to a scheme for still further improving the communication, by carrying a line of rails on to the quays; and no subject has occupied more of the attention of the board during the last half-year. Numerous plans, each possessing intrinsic advantages, have been under consideration; and in stating that they have not yet committed themselves to any, the directors beg to add, that the subject has lost none of its importance in their eyes, but it is desirable to leave the question open to the last available moment. It will thus be thoroughly sifted, and the soundest plan ultimately adopted.

In the meantime they have thought it proper to lodge the notices required for an amended Act in the ensuing session, which comprise several of these plans. The notices also embrace the usual extension of time to purchase land. This matter, in a more matured shape, will be brought before the shareholders at the next general meeting.

Another very important addition to their powers, for which they have applied, is to enable the company to build a pier opposite to Dumbarton, and, by establishing a ferry there, in connexion with the railway, command a very considerable portion of the increasing trade of that town. This pier may be carried out to low water mark at a very moderate expense, as materials can be obtained on the spot, and the directors are satisfied that the returns will be ample.

In connexion with this subject, the directors must not omit to state, that at the request of several proprietors in that district, they caused an exploring survey to be made of the Leven Valley, in order to ascertain the feasibility of carrying a line of railway from Loch Lomond to the Clyde at Dumbarton. The distance is five miles, and the result very favourable to a cheap line. The directors are not prepared to recommend any measures at present, leaving it to their large local proprietary to consider the subject; but, sensible of the advantage it would prove to their railway, the board will forward the views, and assist any company that shall be established for carrying out a scheme which would bring the shores of Loch Lomond, with the populous manufacturing neighbourhood, within one hour's journey of Glasgow.

The board have considered it their duty to petition against a clause in the "Scotch Prisons Bill," which was viewed as injurious to their property.

The board have contracted for ten locomotives, deliverable at different times before the opening, and for wagons which are now building, and have already received pattern carriages, from which they are proceeding to cause a sufficient supply to be prepared. There is, therefore, no reason to apprehend delay on the score of stock.

The directors cannot make a call earlier than the 22d August, but until

it be due they have made such arrangements as will, they trust, provide ample means for the heavy expenditure now going on.

It is gratifying to find that their calls have hitherto been so promptly answered. Of the fourth instalment it will be seen that two-thirds were paid the first week, and on the entire arrears previous to it, the sum of 2,712*l.* only is due, the whole of which is recoverable.

The directors while thanking their proprietors for this punctuality, are desirous of relieving them, as far as possible, from these periodical demands, and propose, in accordance with the 128th section of the Act, so soon as the August call is paid, to take up on loan, at such rates of interest as they shall obtain, the sum of 133,333*l.* The authority for doing this is vested in the present meeting, and is now applied for. No more calls in this case will, it is hoped, be necessary this year.

The directors have now briefly alluded to the principal circumstances with which it is desirable the shareholders should be acquainted, and they will no longer detain them from the interesting reports of the engineer, merely assuring them that every day's information and experience only the more strongly confirm the essential parts of those former statements which have gained for them the support and confidence of the proprietors.

MARK HUISE, *Secretary.*

Greenock, July 5, 1839.

Engineer's Report.—To R. D. Ker, Esq., Chairman of the Board of Directors.

Sir,—In making the present half-yearly report of the state of the works to you for the information of the board, I do not find it necessary to enter into much detail, as your own recent inspections have fully informed you of the precise state of all the important points on the line.

At one place only has there been any hinderance. The tunnels at Bishopton are not so far advanced as was hoped for. This delay has arisen from a variety of causes; one of which was an interdict obtained by the proprietor of the land against sinking one of the shafts. This, together with all impediments, has sometime since been removed. Four stationary engines are at work night and day. The contractor is now enabled to devote most of his time to the works on this line; and I am glad to say we have an evidence of the advantage of his doing so in a steady and unbroken progress at this important point.

In the tunnels, at the Ferry Hill, along the whole Bishopton Ridge, and at Barrangry Hill, the works are pressed forward night and day, with a view to placing the line this summer in a position to secure its completion early in the next.

There are 2,500 men, and nearly 200 horses, at present employed between Greenock and Paisley.

The masonry in Greenock is fully one-half completed.

The Cartburn Hill contract is proceeding rapidly, and I think will be through by the close of the year;—a greater number of yards have been excavated in the last month than in the preceding six.

The masonry through Port-Glasgow is nearly two-thirds finished; and the whole length, from the commencement to the end of Port-Glasgow, may be finished by the close of the year.

On the Finlayston contract considerable progress has been made; and, on Mr. Locke's last inspection, a deviation of the line was suggested, which has been effected with the consent of the proprietors, as it is mutually advantageous to both parties. It diminishes the amount of excavation at Carnegie Hill very considerably.

According to present arrangements, most of the permanent road on this contract will be laid by January, 1840.

On the Bishopton contract more than one-half of the excavation and rock cutting is out; and as this contract was not fairly commenced till September, 1838, there seems no doubt, judging from what has already been done, that it will be finished in time.

The moss on this contract has been crossed at its deepest point without much difficulty.

On the Walkinshaw contract considerable progress has been made, and I have little doubt of its completion, so far as the earthwork and masonry is concerned, before the winter sets in.

The bridges over the River Cart, and the Gryfe Water, are in a forward state.

Little has yet been done at the permanent road, though considerable lengths are ballasted, as blocks of a satisfactory quality could not be obtained by the contractors in time; they are now, however, working quarries of their own, and a sufficient supply of excellent blocks is rapidly coming in.

As all our heavy embankments will be far forward early in the winter, they will have a considerable period of favourable weather for subsidence, thus securing a better road than is usually attainable on the opening of a line.

I may therefore state that I have no present reason to doubt the completion of the line according to contract, and that generally the works are in a forward state.

Detailed plans for the stations are in hand, and pattern carriages from a practised London builder have arrived.—Part of the wagons are finished. Locomotive engines have been ordered by Mr. Locke, from makers whose work he can trust, from the performance of their engines on other lines under his charge; and the whole material required for the opening of the line is now arranging for, or already ordered.

I have the honour to be, Sir, your most obedient Servant,

Greenock, 28th June, 1839.

J. E. ERRINGTON.

GLASGOW AND PAISLEY JOINT RAILWAY.

Engineer's Report.—To the Chairman of the Committee of Management.

Sir,—Since the last meeting of the board, at which I was requested to report upon the progress of the works in the half-year, I have made a careful inspection of them, and examined not only the present state of our operations, but also have satisfied myself as to the arrangements of the contractors, with a view to the final completion of the line at the time specified.

It will be seen from the following detail, that the forwardness of the works fully justifies the prospects held out in my last report.

Immediately on the Tradeston contract being let, the contractor commenced building the bridge over the Polloc and Govan Railway and West-street; and to secure the remaining bridges and arches to the station being completed in time, he has agreed with responsible parties for a regular supply of stone and other materials. The entire line of railway is now, therefore, under contract; and as Mr. Locke has already furnished the plans for the stations at Glasgow and Paisley, together with the elevations for the offices, the whole works, both for the line and depots, will be far advanced this summer.

Two-thirds of the line is formed, and more than half this distance ballasted.

The contractor is laying the permanent rails at various points, and has a considerable length already completed. The difficulty for some time experienced in obtaining a sufficient supply of blocks is now at an end; and there is no doubt, therefore, that at least two-thirds of the railway will be entirely completed early in the autumn.

In the Ibrox contract, the excavations necessary for the embankments are completed, except about 20,000 yards; all the remaining earth is required for the bridge approaches and the Glasgow depot. There has been considerable hinderance to the works on this contract from an interdict against making bricks.

In the Arkleston contract the embankments will be finished in a fortnight, and more than two-thirds of the cuttings are excavated; a great part of the remaining portion is wanted for filling in between the walls through Paisley and for the depot.

The drift-way through the tunnel was completed two months since, and there is now a wagon road in operation for more than half its length. In Paisley, the arch of the bridge over the river, is partly turned; this bridge will be completed long before the time specified. The street bridges and retaining walls are also sufficiently forward to secure their being finished at the time required.

The masonry of the road bridges and the fence walling, is proceeding at a rate to finish nearly the whole by the close of the year.

I may remark, generally, that from the vigorous push now making by all the contractors to take advantage of this favourable season, I am justified in reporting, that there is every reason to anticipate the opening of the line at the time intended.

I am, Sir, your obedient servant,

Glasgow, 20th June, 1839.

J. E. ERRINGTON.

I.

Balance Sheet.—31st May, 1839.

<i>Dr.</i>		<i>£.</i>	<i>s.</i>	<i>d.</i>
To Amount of receipts per last statement		89,378	3	10
Arrears since received		5,197	16	0
Amount of third call, of £2, due 12th January, 1839, on 14,522 Shares		29,044	0	0
Amount of fourth call, of 3 <i>l.</i> , due 22d May, 1839, on 9,901 shares		29,703	0	0
Interest			90	17 2
Shares paid up in full	£10,213 0 0			
Deduct for fourth call, subsequently due	1,572 0 0			
		8,641	0	0
Rent			2	0 0
		£162,056	17	0
Balance			557	18 5
		£162,614	15	5
<i>Cr.</i>		<i>£.</i>	<i>s.</i>	<i>d.</i>
By amount of expenditure per last statement	71,229 10 9			
Engineering accounts	£757 16 8			
Surveying and boring accounts	173 1 0			
Land, and compensation, advances to account,				

valuators' accounts, conveyancing and stamps .	13,849	12	0	
Works	36,084	3	8	
Advertising, printing, and stationery, miscellaneous accounts and petty disbursements	317	10	7	"
Office charges, rent, taxes, salaries, and office furniture	298	16	10	
Travelling charges	15	5	6	
Agency account	246	5	11	
Police, including Missionary at Bishopton	134	3	4	
Iron rails and chairs	11,680	7	4	
Interest on paid up Shares	142	16	1	
Joint committee account, (see No. II.)	27,053	3	9	
Charge for direction	£200	0	0	
Sum voted at last General Meeting for past services	400	0	0	
	600	0	0	
Preliminary expenses of New Act	32	2	0	
	91,385	4	8	
	162,614	15	5	

MARK HUISH, *Secretary.*

II.

Expenditure of the Joint Committee.

	£.	s.	d.
Land and compensation, stamps for conveyancing, &c.	26,239	7	11
Advances on ditto to meet arbitration	680	2	9
Works	19,536	4	7
Engineering, including workmen's wages, sinking shafts, &c.	658	18	6
Rails and chairs	6,689	17	10
Office expenses, rent, salary, stationery, miscellaneous accounts, and petty disbursements	195	13	9
Travelling expenses	17	1	6
Advertising	11	3	0
Police	77	17	8
	£54,106	7	6
Whereof one half is	£27,053	3	9

MARK HUISH, }
J. H. HUMPHREY, } *Secretaries.*

DUNDEE AND ARBROATH RAILWAY.

General Meeting, held June 5, 1839.

REPORT.—The former committees having already so fully detailed, at your previous meetings, the various acts of their management, it is not necessary at present to do more than simply to state the present position of the company, and the prospect of its affairs.

At the last general meeting it will be recollected that the committee was empowered to borrow or take up, upon a cash credit account, any sum of money not exceeding 20,000*l*. No final arrangement of this loan has as yet been completed; but the Eastern Bank of Scotland has made advances to the company in the meantime; and they are willing to allow you a cash credit to the extent of 20,000*l*. upon the security of the company's property, and the tolls and rates arising under the statute. The interest charged by the bank up to the term of Whit Sunday last was at the rate of 4½ per cent.; but in respect of the increased value of money, the rate will be 5 per cent. so long as the present price of money shall continue. It will be the duty of this meeting to sanction this loan, and authorize the committee for the ensuing year to grant the necessary conveyances to the bank.

Your committee have had prepared, and now lay before you, a statement of the expenditure upon the works, from which it will be seen that there has been expended, under the Parliamentary estimate, 94,014*l*. 12*s*. 1*d*. That estimate amounted to 100,000*l*., but did not comprehend the expense of stations, locomotive engines, carriages, &c., &c., necessary for the working of the line, upon which the company has expended 16,450*l*. 0*s*. 3½*d*. It must, however, be kept in view, that the termination of the railway was fixed to be at Carolina Port, and that the expense incurred in the construction of the railway and works from that point to Trades'-lane will fall to be paid by the harbour trustees, when they come to acquire that portion of the line, which they are authorized to do under their statute. This may, therefore, be looked upon as a temporary advance.

You will observe that the expense of the works comprehended under the Parliamentary estimate is still about 6,000*l*. short of that sum; but to complete the work the full amount of 100,000*l*. will require to be expended, exclusive of the 20,000*l*. which is to be borrowed from the Eastern Bank of Scotland. Even with this expenditure, which certainly has exceeded in amount the expectations of your committee, there is no railway in the kingdom which has been completed in the same substantial and permanent manner at nearly so small a cost.

The state of the account with the Eastern Bank, as at the 1st of May, stood thus:—

Advanced for the company	£19,118 19 11
Deduct arrears of calls and difference of interest	13,317 17 6

Leaving due to the bank, when the arrears of calls shall

have been paid up the sum of* £5,801 2 5

Since the last general meeting of copartnery the line has been partially opened from Arbroath to Craigie, and latterly up to the Rood Yards. Your committee deliberated as to opening the line up to the Craigie station, as it was thought by some of its members that the traffic during the winter months, with a terminus so far from Dundee, would not defray the expense of working the line, and the establishment indispensably necessary for that

* A considerable amount of the arrears has been recovered since the report was prepared.

purpose. It was, however, resolved to open the line up to Craigie, and this took place upon the 6th of October last.

Your committee's first consideration was to contract for conveyances for carrying the passengers to and from the Craigie station. They entered into a contract with Mr. Cruikshanks, who bound himself to provide six omnibuses, capable of containing twelve passengers each, with horses, harness, and coachmen, and to defray all the expenses thence arising; and the company, on the other hand, became bound to pay 3*d.* for each passenger so carried. This bargain your committee considered very favourable for your interest; but although the traffic has been greater than was anticipated, yet the contractor has not been a gainer.

Your committee had many important arrangements to make previous to the opening; they required to direct their unremitting attention to pushing forward the works on the line, which was an arduous task; and in consequence of the premises of the engine-maker having been accidentally burned, the greatest exertion was necessary to get an engine ready for the opening.

The line was at last opened to Craigie, a distance of from 14 to 15 miles, as already mentioned; and the progress of the traffic, taking the monthly amount of money drawn, and the number of passengers carried, will be best seen from the following abstract:—

	Passengers.	£.	s.	d.
October	6,713½	434	17	6½
November	7,078½	462	8	0
December	5,105½	351	10	3
January	6,214	412	11	7
February	4,568	318	0	0½
March	7,268	496	18	2½
April	8,748	606	1	2
May	9,477	631	11	3

Total, 55,173 . . . £3,713 19 0½

From the preceding abstract you will perceive that the traffic has steadily increased under the great disadvantage of an incomplete line, with a station 2½ miles distant from Dundee, with very imperfect and somewhat uncomfortable means of conveyance between the station and the town.

Your committee has made up a revenue account, showing the amount of the receipts and expenditure up to the 1st of May last, which is the period fixed by the statute for the balance of the company's books, and it is now laid upon the table.

The receipts stand thus:—

	£.	s.	d.
Passengers' fares	3,013	2	10½
Parcels	62	1	8
Merchandise	12	17	3½

	3,088	1	10
Interest	15	14	1

Total amount, £3,103 15 11

From this sum there falls to be deducted the expense of working the line, the proportion of salaries, &c., amounting to 1,387*l.* 3*s.* 5½*d.*, which would leave 1,716*l.* 12*s.* 5½*d.* as the profit upon the six winter months' traffic.

From this sum, however, there falls to be deducted 381*l.* 15*s.* 1*d.*, which has been paid to Mr. Cruikshanks for omnibus accommodation. This is, however, an extraordinary expenditure, and cannot be reckoned as part of

the ordinary expense of working the line. Indeed, your committee expect in a few months to dispense with this mode of conveyance entirely.

You will have observed that there is only a sum of 12*l.* stated as revenue from the carriage of goods and merchandise, so that the revenue has been wholly derived from passengers and parcels; and although your committee feel satisfied that there will be a great amount of revenue derived from the traffic of goods when the line shall have been completed to Trades'-lane, yet, until then, they cannot expect that parties will take the trouble and incur the expense of carting their goods to and from the station, so long as it is so far distant from Dundee.

With regard to the expense of working the line, it is proper to remark, that it is necessarily almost as great at present as it will be when the line shall have been completed, and in full operation. It was absolutely necessary, for the character and credit of the company, to have the arrangements for managing the present traffic complete and efficient in every department, which could only be accomplished by a full establishment of officers; and although to some the number of persons employed may seem great, yet your committee feel that, had they niggardly restricted this department of the expenditure, they might have injured the interests of the company in the outset, and introduced a tardy and slovenly system of management, which could not have failed to have prejudiced the public against the undertaking. Your committee, with the able and unremitting services of the manager, have introduced a system of management, combining regularity, promptitude, and despatch; and they hope that they may be permitted to state, that the company's arrangements and regulations are as complete and efficient as those upon the great lines of railway.

It may be mentioned that the committee were about to lose the services of the resident engineer, Mr. Deas; he was offered an appointment upon the Edinburgh and Glasgow line; but as they put a very high value upon his services, they resolved to increase his salary from 220*l.* per annum to 300*l.* per annum; and they also agreed to make the manager's salary at the rate of 300 guineas per annum, of both of which acts of management your committee have no doubt you will at once approve. The company will be enabled to dispense with the services of Mr. Deas when the work shall have been completed. His engagement terminates in January next.

Looking to the unfinished state of the line, the severe winter months,—which form the greater part of the period comprehended in the statement—and to the fact that the income has arisen solely from passengers, your committee entertain the most sanguine expectations of the complete success of this undertaking; and they feel satisfied from the traffic, which is steadily increasing, and from the addition which has been recently made to the line, that they will be able, at the next annual general meeting, to declare a handsome dividend upon the stock of the company. Your committee cannot, however, recommend you to make any dividend at this time. Had the expenses of the omnibus accommodation not been deducted from the ordinary revenue, they might have been disposed to declare a dividend; but they think you will consider it a more prudent management of your affairs, that the free revenue of 1,334*l.* 17*s.* 4½*d.* should be carried to the credit of a reserved fund, to be created for behoof of the company.

You are all aware of the great difficulties with which your committee have had to contend upon Lot 1st of the works, which passes through the deep cutting upon the estate of Craigie, and by a bulwark and embankment on the bed of the river. The most careful and anxious attention of the committee has been directed to this part of the work. They have, by sub-committees, and individually, visited it weekly, and no effort has been

spared by the company's servants to facilitate and push on the works; in consequence of which, on Monday last, two additional miles of the line were opened up to the Rood Yards, where a temporary station has been formed at the least possible expense.

There is yet a great extent of embankment necessary to complete the line up to Trades'-lane, and there are many arrangements which will fall to be made to ensure the speedy completion of this portion of the line. This is a most important and pressing matter, and will require the immediate consideration of the committee for the ensuing year, as it is manifest that the line must labour under great disadvantage until it is brought up to Trades'-lane. The attention of your committee has long been directed to the desirableness of this object, and they have seen the great advantage which would result from continuing the embankment from Trades'-lane eastward; but so long as the claims of Mr. Adamson against the Harbour Trust remained unjustified, there was no alternative but to proceed with the works from the eastward, otherwise you might have been involved in serious claims of damage, had the opening of the dock wall been shut up through the company's operations. This question has now, however, been brought to a final termination, and your committee has already applied to the trustees to have the opening filled up, so that the company may proceed as rapidly as possible with the embankments from the west end. No answer has as yet been received to this application; but your committee feel assured that the trustees will readily agree to this request, as the completion of the line to Trades'-lane cannot fail to be of great advantage to the harbour and the trade of the town, while it is a matter of the deepest importance to the interest of this company.

The committee have been long anxious to secure an eligible site for the dépôt at Dundee, but have not as yet completed any arrangement for this purpose. They have various situations in view, and they have offers at a lower rate of feu-duty than was asked twelve months ago: they have, therefore, no doubt they will be still able to make better terms for the company.

Your committee are still beset with the litigations at the instance of Mr. Lindsay and Mr. Hunter, which were formerly brought under your notice; they are, however, advised by the highest legal authorities at the Scottish bar, that the pleas which are urged against them are groundless and untenable. While this is the case, your committee has recently made a tender of very liberal terms of compromise to Mr. Lindsay; and as they have, in their anxiety for a settlement, exceeded the concessions recommended by their counsel, they see no alternative but to defend the company against such unreasonable demands.

For the committee,
(Signed)

JOHN STURROCK.

General Account of the Receipts and Disbursements of Cash by the Dundee and Arbroath Railway Company, to 1st May, 1839.

May 1, 1839.	RECEIPTS.	£.	s.	d.
To capital account, for sums received		88,082	17	0
Revenue account, do.		2,722	0	10
Eastern bank		19,118	19	11
		<hr/>		
		£109,923	17	9
		<hr/>		

May 1, 1839.	DISBURSEMENTS.	£.	s.	d.
By capital account, for sums disbursed		108,420	3	1½
Revenue account, do.		1,387	3	5½
Balance of cash in hand		116	11	2
		<hr/>		
		£109,923	17	9

Capital Account to 1st May, 1839.

DEBTOR.

To formation of road, &c., viz.—

For the following, comprehended in Parliamentary estimate :—

Ground and other property to account	£.	s.	d.	£.	s.	d.
Cottages at West Ferry	6,786	6	8			
Houses at West Haven	192	9	3			
Earthwork, &c., to account	7,078	9	7			
Drains, &c. do.	955	10	2½			
Bridges, and culverts, do.	4,720	9	9			
Boxing and ballasting, do.	2,105	7	0			
Blocks and sleepers, do.	8,679	10	5			
Rails and chairs, do.	32,669	14	5			
Waylaying do.	1,523	10	3			
Fencing and bulwarks, do.	4,795	0	8			
Pins, keys, &c., do.	1,482	11	4			
Damages	425	7	5			
Altering roads	829	0	0			
Contingent work	611	4	7			
Engineering	1,740	12	9			
General management	599	14	6			
Adjusting rails	227	16	2			
Contractors who have not finished their contracts, paid to account	18,143	1	3			
Miscellaneous charges	688	0	5½			
	<hr/>			94,971	15	1

For the following not comprehended in Parliamentary estimate :—

Act of Parliament	2,448	15	2
Arbroath station	2,813	0	1½
Carnoustie do.	354	10	0
Monifieth do.	14	17	7
Broughty Ferry do.	1,205	2	6
Craigie do.	295	9	4½
Counting-house furniture, &c., at Dundee	124	10	7½
Engines and tenders, to account	2,900	0	0
Passenger coaches, do.	3,319	5	9
General trade wagons, do.	531	12	1
Tools and implements	35	2	6
Law charges, conveyances of land, and expenses in jury trials	1,011	16	4
Opening expenses	49	17	2
Feu duties	388	18	1
	<hr/>		

15,492 17 3½

£110,464 12 4½

CREDITOR.			£.	s.	d.	£.	s.	d.
By subscribed capital	.	.	100,000	0	0			
Deduct arrears of calls unpaid	.	.	12,862	10	0			
						87,137	10	0
Loan account, per Eastern Bank	.	.				19,118	19	11
Interest on arrears of calls, &c.	.	.	945	7	0			
Deduct—								
Interest to Eastern Bank	.	434	15	0				
Do. on price of ground purchased, &c.	.	39	10	5				
Do. to revenue account	.	15	14	1				
			489	19	6			
						455	7	6
Revenue account	.	.	.	.	.	1,334	17	4½
Balance	.	.	.	.	.	2,417	17	7
						£110,464	12	4½

Revenue Account, from Opening on 8th October, 1838, to 1st May, 1839.

DEBTOR.			£.	s.	d.	£.	s.	d.
May 1, 1839.								
To engine expenditure, viz.—								
Coal	.	.	7	14	8			
Coke	.	.	282	5	11			
Repairs	.	.	60	2	2			
Oil and tallow	.	.	69	10	5			
Cartage, &c., of water	.	.	29	16	3			
Wages to engineer and firemen	.	.	85	18	0			
Incidental charges	.	.	15	16	8½			
						551	4	1½
To carrying account, viz.—								
Wages to guards, porters, &c.	.	.	208	14	4			
Guards' dresses, parcel bags, &c.	.	.	23	19	0			
Repairs on coaches	.	.	7	16	0			
Incidental charges	.	.	4	8	11			
						244	18	3
To salaries, viz.—								
Proportion of manager's salary	.	.	147	3	6			
Accountant	.	.	57	2	3			
Clerks	.	.	189	19	8			
						394	5	5
To general charges, viz.—								
Advertising and printing	.	.	76	7	1			
Stationery	.	.	48	2	0½			
Insurance	.	.	25	1	8			
Sundries	.	.	47	4	10½			
						196	15	8
Balance	.	.	.	.	.	1,334	17	4½
						£2,722	0	10

May 1.	CREDITOR.	£.	s.	d.	£.	s.	d.
By receipts, viz.—							
Passengers' Fares		3,013	2	10½			
Parcels		62	1	8			
Merchandise		12	17	3½			
		3,088	1	10			
Deduct—							
For intermediate coaching		381	15	1	2,706	6	9
Interest on sums paid to capital account					15	14	1
					<u>£2,722</u>	<u>0</u>	<u>10</u>

Dr.	BALANCE.	£.	s.	d.
May 1, 1839.				
To capital account		2,417	17	7
Cash account		116	11	2
		<u>£2,534</u>	<u>8</u>	<u>9</u>

Cr.	CONTRA.	£.	s.	d.
May 1, 1839.				
By sundry accounts for balances due by the company . .		<u>£2,534</u>	<u>8</u>	<u>9</u>

Note of Salaries Paid the principal Servants of the Company.

	£.	
Manager, per annum	315	
Secretaries, do.	75	
Resident engineer, do.	300	
Accountant	110	
Station clerks, viz.—		
Arbroath, per annum	80	with dwelling-house.
Carnoustie, do.	50	do.
Broughty Ferry, do.	50	do.
Rood-Yards, do.	60	
Dundee, do.	60	

YORK AND NORTH MIDLAND RAILWAY.

SIXTH Half-yearly Meeting, held at the company's offices, in York, July the 8th; the Lord Mayor, as chairman of the company, in the chair. After some preliminary matters, Geo. Baker, Esq., the secretary, read the following report:—

It affords the directors much gratification to state that, in conformity with the announcement contained in their last half-yearly report, they were enabled in the month of May last, to open the York and North Midland Railway as far as its junction with the Leeds and Selby line. On the 30th of that month, the conveyance of passengers and merchandise was commenced, and the extent of business since done on the line has fully realized every reasonable expectation. From the opening to the 1st instant, being

a period of thirty-two days, the total number of passengers conveyed is 11,783½, and the amount of the receipts for passengers, parcels, coals, lime, and other merchandise, is 1,435*l.* 6*s.* 2*d.* During this short period the traffic on the line would have been more considerable, had the supply of coal brought to York equalled the demand. For several days, owing to circumstances which the directors could not control, that was not the case, and great disappointment was experienced by many inhabitants of the city and neighbourhood. An arrangement is now made with the coal-owners, by which this inconvenience will be remedied, and a sufficient supply secured for the future.

Judging from the past, the directors are of opinion that the ordinary cost of working the line and maintaining the requisite establishment, will amount to less than one-third of the given income, and consequently, should the receipts continue to equal their present amount only, the directors consider themselves justified in anticipating that, at the close of the year, they will be able to declare a handsome dividend on the capital expended in the formation of that part of the line which is now in operation.

It is shown by the annexed cash statement, that the total disbursements of the company to the 30th ult. is 212,145*l.* 15*s.* 3*d.*, and the proportion of this sum, which the directors calculate may be fairly taken as the amount of the expenses attending the construction of the 14 miles already completed, is 135,000*l.* This computation includes the carriages and locomotive-engines, and other necessities of outfit.

With regard to the southern part of the railway, it is satisfactory to report, that the whole of the land is purchased, and every part of the line has been let to experienced contractors, at sums, in every instance, considerably below the engineer's estimate. The whole of the works on the line are now in active progress, and the parties are under engagement to complete their contracts early in the spring of 1840; and the directors do not at present see any reason whatever to doubt that the works will be completed in sufficient time to open the York and North Midland Railway simultaneously with the North Midland and Leeds and Manchester line.

Under the power granted to the directors at the last half-yearly meeting of shareholders, they have borrowed the whole of the money which the Act of Parliament authorizes the company to take up on debentures at interest on the credit of the undertaking.

The directors regret to state that the judgment of the Court of Exchequer Chamber was pronounced last week, by which the decision of Lord Chief Justice Denman, in the case of the company and Lord Howden, was reversed; but, as the opinions of so many of the judges have been declared in favour of the company, it is the intention of the directors to prefer an appeal to the House of Lords.

A General Statement of Payments and Receipts to the 30th June, 1839.

	RECEIPTS.	£.	s.	d.
Amount of receipts as per last statement		123,453	17	2
Cash received on calls		50,134	7	0
Calls in advance		1,300	0	0
Cash received on loan		98,350	0	0
Interest			3	10
Great North of England Railway Company		1,000	0	0
		<hr/> £274,306		
			11	10

	EXPENDITURE.	£.	s.	d.
Amount of payments as per last statement		97,950	2	5
General expenses		903	16	3
Law expenses		1,127	13	8
Mr. Stephenson, on account of salary		250	0	0
Surveying and assistant engineers' salaries		281	4	0
Allowance to directors		250	0	0
Advertising, printing, &c.		80	8	5
Copmanthorpe enclosure		11	10	6
Land and compensation		40,798	7	6
Salaries		185	0	0
Timber		6,801	16	11
Anti Dry-rot Company		209	10	6
Old buildings		737	2	0
Carriages and engines		7,819	5	0
Iron rails, chairs, &c.		16,241	13	9
Contracts		38,498	4	4
		212,145	15	3
Cash in the hands of the bankers		62,160	16	7
		<u>£274,306</u>	<u>11</u>	<u>10</u>

LONDON AND BRIGHTON RAILWAY.

General Meeting, held July the 18th, at the London Tavern, Bishopsgate-street; JOHN HARMAN, Esq., in the Chair.

REPORT OF DIRECTORS.—Under the provisions of the Act of Incorporation, the directors have convened the Fourth General Meeting of the Proprietors, in order to put them in possession of the progress of the undertaking during the last half-year, and to lay before them the present state of the company's affairs.

The directors have now purchased, or agreed for the purchase of all the land which it is necessary to purchase, the total amount of which is about 340,000*l.* In making these purchases the company has been obliged, as is usual, to take a considerable quantity of land not absolutely required for the site of the railway, and which when resold, will, at a moderate estimate, realize 60,000*l.*

In some instances the directors have been compelled to resort to juries, in consequence of the extravagant demands made upon them by the land-owners, and in these cases the gross amount claimed was 120,000*l.*, and that awarded by the juries 33,000*l.* 7*s.*, making a difference in favour of the company of 86,999*l.* 13*s.*, a result fully justifying the course adopted.

When it is considered that the directors have had to settle the amount of compensation to be paid to about 1,500 parties interested in the land required for the railway, and that the whole of their interests have been arranged within the two years limited by the Act, and that more than six months elapsed after the passing of the Act before the company were in a situation to make a single purchase, they cannot but congratulate the proprietors that all this has been effected without incurring the risk and expense of applying to the Legislature either for an extension of the time for the purchase of the land, or for fresh powers to deviate from the line authorized by Parliament, which the directors believe to be unprecedented.

The directors proceed to lay before the meeting a report of their engineer, containing a detailed account of the state of the works up to the present period; but before doing so, it may be well to state that the gross amount at which the contracts are all let is 658,332*l.* 6*s.* exclusive of the tunnels, which are estimated at about 150,000*l.*

"Report of Engineer.—To the Chairman and Directors of the London and Brighton Railway.

"GENTLEMEN,—I beg leave to report to you the present state of the works :—

"Contract, No. 1.—The contractor has completed five of the bridges on this contract, with their approaches, with the exception of a small portion of the parapets, and only three other bridges remain to be built. The quantity of earthwork that has been removed has enabled the contractor to form the roadway for about 1½ miles, and of this about 72 chains have been laid with permanent rails. This contract would have been completed by this time if possession could have been had of the whole of the land. There are employed on this contract 277 men and 39 horses.

"Contract, Nos. 2 and 3.—The contractor for these contracts has gone on very satisfactorily, and he has been at work upon every cutting on the line except one, a great portion of the embankments have been formed, and he has cut through all the cuttings, from the Godstone road to Hooley House, and has laid about 1½ miles of single permanent way, and as he is engaged in laying the remainder of the way through the cuttings, he will have, in the course of a week a run of 2 and 1-8th miles for a locomotive engine (to carry the cutting to the head of the embankment), which engine is now ready to come up from the country. In contract, No. 2, three bridges have already been built, and three remain to be built. The cuttings in No. 3 contract, have proceeded in a satisfactory manner, and great progress has been made in the works; there are only two bridges on this contract which remain to be built. The contractor has at work on these contracts 518 men and 52 horses, and in the course of a fortnight a locomotive engine will also be at work.

"Contract, No. 4, Merstham tunnel.—The whole of the shafts have been sunk down to the bottom of the tunnel, and the driftway has been driven through from end to end, and the contractor has commenced bricking the first tunnel lengths at four of the shafts, and he is driving for the tunnel in the other four. As the material is of a very excellent quality for driving in, and he is a most experienced workman in tunnelling, and has to devote his whole time to the work, he will very easily complete the tunnel in less than twelve months. He has at work 290 men and 25 horses.

"On the extra contracts at Merstham for the diversions of the turnpike roads, one diversion has been completed, and is now opened to the public. The second diversion of the road will be opened to the public in the course of a week, and the third is rapidly proceeding with. This contractor has at work 160 men and 30 horses.

"Contract, No. 5.—The contractor is now at work upon every part of this contract, and has made the most satisfactory progress; he has nearly done one-half of the earthwork; he has built three bridges, three are in hand, and five remain to be built, and I expect he will complete the whole of these bridges before winter. There is nearly three-quarters of a mile of single way of a permanent line laid on this contract. He has at work upon this contract 685 men and 65 horses.

"Contract, No. 6.—This contract goes on very rapidly, and the works are

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is progress over the whole of the line; he has built one bridge, two are in hand, and two more remain to be built. He has done considerably more than one-third of the earthwork, and has at work upon this contract 280 men and 50 horses.

"Contract, No. 7.—The contractor has done nearly one-fourth of the earthwork on this contract; three bridges are built, two are in hand, and six remain to be built, the principal of which will be built before winter. A great portion of this contract runs nearly on the surface, and on which the rails will be laid early in the spring. The contractor in the course of a month, will have about one mile and a quarter of single way laid, and a locomotive engine will then be at work upon it, to carry the earthwork into the principal embankment at the three bridges. The contractor has at work upon this contract 177 men and 12 horses.

"Contract, No. 8, Balcombe tunnel.—The whole of the shafts for this tunnel have been sunk down to the bottom. The drift way has been driven from end to end, and the water which had been so very powerful during the progress of the works, has been entirely released, and run off by the adit, which was driven up from the brook course; and the contractors who undertook the work under Mr. Hoof, have now contracted for the driving and bricking of the tunnel, and I have much pleasure in saying, that during the whole of the operations of sinking and driving, they have shown by their perseverance and industry, that they were the men to complete the work; and I hope, before this day twelve months, to have the tunnel completed through this summit. These contractors have commenced driving for the tunnel, and in the course of a fortnight two or three lengths will be ready for bricking. They have at work 204 men and 20 horses.

"Contract, No. 9.—The contractor is at work upon every part of this contract. He has done more than a quarter of the earthwork; he is now building one of the bridges, and will immediately commence upon five others. He has at work upon this contract 294 men and 34 horses.

"Contract, No. 10, Ouse Viaduct.—The contractor has proceeded very rapidly and satisfactorily with this viaduct, he has got in 28 of the foundations of the piers up to the level of the ground, six only remain to be put in, and the two abutments. The foundations have all proved most satisfactory, and before the winter sets in, he will have run the piers up to a very considerable height, as he has made a very large stock of bricks, and will continue to make more, as long as the weather is favourable. The contractor has at work upon this contract 208 men and 54 horses.

"Contract, No. 11.—The contractor has not long had possession of the whole of the land; he has, however, made good progress, having excavated nearly one-fifth of the earthwork, he has commenced building one bridge and some of the culverts, but he has not been able to begin upon the others from the short time he has had possession of the land, but the principal of them will be built before Christmas. He has at work upon this contract 420 men and 57 horses.

"Contract, No. 12.—The contractor has not had possession of the land long enough to make much progress with the earthwork, not having excavated above 27,000 cubic yards; he has, however, made good progress with the brickwork, having got in the foundations of Valepool viaduct, and built one bridge. The contractor has at work upon this contract 120 men and 12 horses.

"Contract, No. 13.—The same contractor who has the last contract, has also this, the whole of which has been pushed on very rapidly and successfully, the contractor has almost done one-half of the earthwork, he has built

three bridges, and the five remaining ones will be built before winter. Nearly one mile of permanent road has been laid. Upon this contract there are 440 men, and 60 horses, besides a locomotive engine ready to put to work, as soon as a few more permanent rails have been laid.

"Contract No. 14, Clayton tunnel.—The whole of the working shafts of this tunnel have been sunk down to the level of the bottom, and the driftway has also been completed, except between four of the shafts near the centre of the tunnel, the greatest length that is now to drive being about 45 yards each way, and the total of the driftway to be done not exceeding in the whole 260 yards; this will be all readily done in five or six weeks. As the driftway has now been driven through the whole of the impervious strata at the north end of the tunnel, it has drained off the whole of the water, and the progress of the work will not be again interrupted. Four hundred yards of this tunnelling at the south end have been contracted for, and the contractor is now getting out the first tunnel lengths, which will be ready for bricking in ten days' time, and other parties are ready to contract for the remainder as soon as the driftway is completed.

"Contract No. 15.—The contractor has only begun upon this contract about three weeks, he has nevertheless excavated about 50,000 cubic yards. The whole of these excavations have to go to spoil, and consequently any number of men can be put to work. The contractor has 300 men at work and 21 horses.

"Contract No. 16.—This contract completes the line of railway down to the entrance of the station at Brighton. As the works upon this contract work so advantageously from the cuttings each way into the embankments, and as the same person who has taken the contract has also the Shoreham branch line No. 17, and the station contract No. 18, both of which will be soon so far completed as to set all his materials at liberty, it is thought most advisable that he should not commence upon this contract for a month or two.

"Contract No. 17, Shoreham branch.—This contract was commenced in August last, and there only remains about 60,000 cubic yards to go into the embankments, 14 bridges have been built, and three light ones only remain to be built. The short tunnel at New England Farm is working at in three places; there has been $3\frac{1}{2}$ miles of permanent road laid down, over which a locomotive engine is employed to carry down the cutting to the embankment at Shoreham. The whole of this contract will be completed in 12 weeks, and then passengers, goods, and coals, may be conveyed over the line. There is at present at work upon this line 203 men, 31 horses, and one locomotive engine.

"Contract No. 18, Brighton station.—The contractor began upon this contract last April, and has made rapid progress with the work; he has done considerably more than half of the excavation, only two bridges are to be built, both of which are in hand, and the whole of the work may be done in about four months, which will give to the Shoreham branch the advantage of this station soon after it is completed. The contractor has now at work upon this contract 180 men, 27 horses. There is on hand a good supply of rails, chairs, blocks, and sleepers ready to be laid down as the work proceeds.

"The following is a summary of the earthwork removed and to be removed on the line, and of the men and horses employed on the works:—

No. of Contract.	Quantity of earthwork removed.	Quantity of earthwork to be removed.	Number of Men.	Number of Horses.
1	115,000	94,425	277	39
2	328,000	138,494	228	34
3	297,000	290,203	290	18
4	Tunnel just begun.	. . . . .	290	25
5	398,000	441,381	680	65
6	147,000	245,873	280	50
7	148,523	354,876	177	12
8	Tunnel just begun.	. . . . .	204	20
9	125,143	310,982	294	34
10	The viaduct.	. . . . .	208	54
11	100,410	448,999	420	57
12	27,000	526,710	120	12
13	320,000	400,000	440	60
14	Tunnel just begun.	. . . . .	178	11
15	50,000	662,000	300	21
16	Not begun.	341,121		
17	230,000	60,000	203	31
18	130,000	112,000	180	27
	2,416,076	4,427,064	4,769	570

"The directors will perceive from the foregoing summary that one-third of the whole of the earthwork has been excavated, and this has been done in a period of eight months; from which it might appear that sixteen months more would be required to remove the remainder; but as at the commencement of the works upon every contract it requires a considerable time to stock it with materials, wagons, horses, &c., the above period is no criterion of time necessary to complete the remainder. I trust, therefore, you are satisfied with the progress of the works; and I have only to add, that the whole of the railway can be opened to the public within eighteen months.

"I am, Gentlemen, your obedient humble servant,

"JOHN URPETH RASTRICK."

From the forward state of the works there appears to be no doubt but that some miles of the line between Croydon and Merstham can be opened to the public early in the ensuing spring, and the directors have little doubt, were such portion opened, the greater part of the Brighton traffic would be carried upon it. The Shoreham branch can also be opened in about three months, when it would carry the whole of the trade between Brighton and Shoreham.

The directors have the satisfaction of stating, that since the last meeting they have come to an amicable arrangement with the South-Eastern Company as respects that portion of the Brighton line which the South-Eastern Company had the option of purchasing, by which that portion is reduced one half, and each company is to carry its traffic over the other's moiety, free of toll, and which arrangement has been confirmed by the Legislature.

The money expended by the Brighton Company for the land and works upon that portion of the line which the South-Eastern Company have the option of purchasing, is to be repaid with interest by the South-Eastern

Company, thereby diminishing the cost of the Brighton line at least 200,000*l*.

In pursuance of the resolution of the last general meeting, the directors have caused to be sold by public auction, the 103 shares that were then forfeited, and which have realized the sum of 1,209*l*. 14*s*. 5*d*., so that the whole of the first call has been paid upon the 35,397 registered shares. The 2*d* call of 3*l*. per share remains unpaid upon 1,130 shares. The 3*d* call of 3*l*. per share remains unpaid upon 2,055 shares. The 4*th* call of 3*l*. per share remains unpaid upon 6,772 shares; and the 5*th* call of 5*l*. per share remains unpaid upon 18,605 shares. The shares upon which the 2*d* call had not been paid, amounting to 2,394, were on the 6*th* day of December last declared forfeited by the directors, and those upon which the 3*d* call had not been paid, amounting to 4,347 (including those forfeited for non-payment of the 2*d* call), were also declared forfeited on the 28*th* day of March last, since which period 1,264 shares have been paid up in respect of the 2*d* call, and 2,292 shares in respect of the 3*d* call, leaving 3,185 shares now to be disposed of by this meeting.

From the foregoing statement, it appears that there is due to the company in respect of the 2*d*, 3*d*, 4*th*, and 5*th* calls, the sum of 122,896*l*., and it therefore becomes necessary that this meeting should determine what course shall be taken in respect of them.

It appears to the directors absolutely necessary, in order to ensure the speedy completion of the undertaking, that some decisive measures should be resorted to in respect of those shares, as the works will be considerably retarded, and much loss will be occasioned to the company on account of the apathy shown by those proprietors, and as the question is one wholly affecting their interests, the directors are desirous of having the opinion of the proprietors as to the mode best calculated to ensure a speedy payment of the outstanding arrears. The directors cannot allow this opportunity to pass, without expressing their hope that the proprietors generally will not be led away from their own interest by following the course pointed out by a proprietor, who, by advertisements and otherwise, has recommended them to withhold the payment of their calls, an advice which, if followed, must tend to retard the progress of the works, to injure the undertaking, and prove highly prejudicial to the interests of the company.

The directors having taken into consideration the probable amount necessary to complete the whole of the works, feel confident that it will only be necessary to make further calls upon the proprietors to the extent of 8*l*. per share, as they are then authorized by the Act of Parliament to raise 600,000*l*. by way of loans.

A vacancy having occurred in the direction since the last meeting, by the lamented death of Mr. Clay, the directors have filled it up by the appointment of Robert Cotesworth, Esq.

The following is an account of the receipts and expenditure of the company from the 1*st* January to the 30*th* June last:—

*Abstract of the Receipts and Payments of the Directors, from January 1*st* to June 30*th*, 1839.*

	DEBTOR.					
	£.	s.	d.	£.	s.	d.
Balance of cash, 1 <i>st</i> January, 1839	27,720	3	9			
“ Exchequer Bills	20,000	0	0			
“ Loan	20,000	0	0			
	<hr/>			67,720	3	9
Cash received on the 1 <i>st</i> call	555	0	0			
“ 2 <i>d</i> do.	4,248	0	0			

Cash received on the 3d call	25,509	0	0		
“ 4th do. . . .	81,828	0	0		
“ 5th do. . . .	69,450	0	0		
				181,590	0 0
Loan				30,000	0 0
Interest—On calls in arrear	940	3	11		
“ On loan	120	0	0		
“ Exchequer bills	446	3	4		
				1,506	7 3
“ Premium on do. . . .				650	0 0
Shoreham wharf				133	18 5
Cash advanced upon the 6th call				36	0 0
				<u>£281,636</u>	<u>9 5</u>

CREDITOR.

	£.	s.	d.	£.	s.	d.
Land and compensation	71,906	12	5			
Parliamentary expenses	360	4	0			
Engineering and surveying	6,653	2	4			
Contracts	107,740	1	11			
Works—including rails, stone blocks, sleepers, Kyanizing	52,259	10	7			
Engines—two locomotive engines	3,118	3	7			
Law expenses—including expenses of juries	1,881	15	6			
Direction	1,050	0	0			
Office expenses—comprising salaries, travelling, stationery, postages, and petty expenses	1,891	6	8			
House—No. 10, Angel-court	35	0	9			
Advertising, printing, and engraving	142	13	8			
Police	1,168	16	1			
Commission	140	16	4			
				248,348	3	10
Balance of cash				<u>£33,288</u>	<u>5</u>	<u>7</u>

The directors have only to add, that in consequence of an investigation now pending in the House of Commons, and in order to set at rest every question as to the means of accommodating the great traffic expected from the Brighton line upon the Greenwich Railway, measures are in contemplation for widening such railway, from the junction of the Croydon Railway to the terminus at London-bridge.

In conclusion, the directors think that the proprietors cannot but be gratified with the present state of the undertaking, the whole of the land having been purchased or agreed for—all the works being in a forward state—and the amount at which the contracts have been taken being most satisfactory; and the only requisite to bring the railway to an early completion, is the cordial co-operation of the proprietors with the directors—who pledge themselves to use, as they ever have done, every care and exertion in discharge of the trusts reposed in them; and they are firmly convinced that everything they have hitherto held out to the proprietors, will be fully realized.

JOHN HARMAN, *Chairman.*

GREAT LEINSTER AND MUNSTER RAILWAY.

First Extension from Dublin to Kilkenny.

Special General Meeting, held Monday, 22d July, 1839, at the company's offices, 62, Moorgate-street; FRANCIS WILSON, Esq., deputy chairman of the company, in the chair.

REPORT.—At a meeting of the company, held on the 13th of May, a resolution was passed “requesting the directors to convene a special general meeting of the company during the month of June.” The directors would have cheerfully complied with that request, if, by convening the meeting, the objects for which it was intended to be held could have been attained. But Government having delayed till the 25th of June, to announce their abandonment of the measure introduced by Lord Morpeth into Parliament, relative to railways in Ireland, and leaving to private enterprise their construction, it would have been idle prior to that announcement to convene the company. They trust this will satisfactorily account for the delay which has occurred.

Immediately upon that announcement being made by Lord Morpeth, the directors lost no time in seeking an interview with the Chancellor of the Exchequer and the Secretary for Ireland, and on the 8th inst. a deputation from the directors waited on them, in order to ascertain “to what extent Government would be disposed to assist private enterprise by the advance of loans at moderate interest or otherwise,” a course strongly recommended in “the Report of the Railway Commissioners.” The directors felt, that in making this application, they were only asking that aid rendered indispensable from the measures adopted by Government, which placed the company in a state of doubt and uncertainty, and diminished that public confidence which was manifested in their earlier proceedings.

The following memoranda were then submitted for the consideration of Her Majesty's Government:—

“MEMORANDA for the consideration of Government, on behalf of the Great Leinster and Munster Railway Company.

“That private enterprise having been paralyzed by the report of the Railway Commissioners and the subsequent adoption of that report by Government, public confidence cannot be sufficiently restored to induce investment in railway undertakings in Ireland, unless the sanction of Government be extended towards them.

“That the line laid down by the Great Leinster and Munster Railway Company is nearly identical for the first twenty miles with that adopted by the Railway Commissioners, and is, therefore, so far equally available for a main trunk to the south or south-west of Ireland.

“That Kilkenny, and the districts traversed by the last 46 miles of the line projected by the company, are deemed of so much importance by the Railway Commissioners, that a branch to Kilkenny through those districts is recommended in their report.

“That it is apparent, from the foregoing, that upwards of 60 miles of the Kilkenny line has the approval of the Railway Commissioners, and its importance as a remunerative undertaking for its entire extent fully recognised.

“That the directors are now willing, with the co-operation of their proprietary, to commence the works immediately, if the Government agree to lend one-half the amount expended in the construction of the line; but no advance to be made by Government until an equal amount shall have been actually expended by the company.

"That if this proposition be approved—should the Government, in the ensuing session, obtain the sanction of Parliament to the plan lately proposed by them, the directors will not impede the more extended and national objects of Government, but will recommend their proprietary to cede to Government the main trunk—reserving only that the interests of their proprietary should, in such case, be equitably considered.

"The adoption of this course is fraught with the following advantages:—

"1st. It would embrace either of the recommendations contained in the report of the Railway Commissioners, namely—'a liberal advance by Government in aid of private enterprise;' or, 'leave open to Government the construction of railways in Ireland as public works,' if, at any future period, such a measure should be deemed advisable.

"2d. It insures to Ireland, without further delay, the introduction of railway communication.

"3d. It gives to Government that salutary control over those undertakings which the report of the Railway Commissioners so strongly recommends.

"4th. By the immediate commencement of the first portion of the main trunk, the plan proposed by Government, if proceeded with in the ensuing session, would be so far advanced—while, on the other hand, if the sanction of Parliament be not then obtained to such plan, considerable progress will have been made in an undertaking which is admitted by the Railway Commissioners themselves to traverse important districts, and to hold out the prospect of remuneration to the proprietary.

"5th. Immediate employment will be afforded to the labouring classes in their present destitute state, and the progress of the works must tend materially to alleviate the pressure and facilitate the operations of the Poor-laws, so recently introduced into Ireland.

"FRANCIS B. BEAMISH, *Chairman of Deputation.*

"*London, 9th July, 1839.*"

The directors are aware that they have made concessions to Government, which they conceive should be sufficient to induce that assistance which they, on the part of the company, have sought; but whilst they deemed it expedient thus to concede to the views of Government, they have endeavoured at the same time to protect the rights and interests of their proprietary, whose sanction they hope to receive; and they trust that the propositions submitted to Government will be met in the same spirit by which they were prompted, and that, with the co-operation of the proprietors, so important and useful an undertaking may be no longer delayed. Sustained by their proprietary, the directors will be enabled to proceed with vigour in the execution of the works, always satisfied that ample remuneration must be the result. The estimates of traffic and intercourse have been so frequently and so minutely tested, that no room has been left for doubt upon this vital point.

It is also important again to refer to a proposed modification of the levels, by increasing the inclinations to 16 feet in the mile, or 1 in 330; experience having proved that such gradients, for all practical purposes, are equally efficient, and by their adoption on the Kilkenny line, the estimates will be reduced upwards of 100,000*l.* But however favourably the directors may view this great undertaking, and however satisfied they may be in their own minds of the advantageous and profitable results to be derived from it, they will not attempt to carry it on by coercing a reluctant proprietary.

The directors cannot avoid expressing their conviction that the present disadvantageous position of the company is mainly attributable to the in-

jurious influence of the report of the Railway Commissioners, and consequent expected interference of Government; but the company are now at liberty to proceed with their undertaking, and it requires only that the proprietors, by the prompt payment of "calls," enable the directors to take the requisite measures. To bring to issue this point, and as a step equally necessary, whether for the prosecution or relinquishment of the undertaking, the directors have resolved immediately to declare forfeited all shares upon which the first call shall remain unpaid on the 15th of August next; and when, in accordance with the provisions of the 87th and 89th sections of the Act of Incorporation, it has been determined how many shares are finally forfeited, the future proceedings of the directors will be thereby regulated.

The directors are again reluctantly called upon to suggest the propriety of the adjournment until the answer of her Majesty's Government to their memorial has been received. When that answer shall be received, whatever may be its purport, the time will then have arrived for the propriety to decide on the course which it may be prudent for their interests to adopt, the directors being determined to be guided by their decision.

As the half-yearly general meeting of the company must be held in the month of August, the directors would recommend the adjournment till that meeting.

PRESTON AND WYRE RAILWAY.

REPORT.—In accordance with the resolutions adopted at the general meeting of the 21st of January last, an Act of Parliament has been obtained, empowering the company to raise 170,000*l.* by the creation of new shares, for the purpose of completing the railway and harbour works. In pursuance of the resolutions adopted at the two last special general meetings, an Act for the junction of the railway and harbour and of the dock companies, was also applied for, and has since been passed.

The directors have to announce that the following gentlemen have been elected directors:—John Abel Smith, Esq., M.P., Levy Ames, Esq., Hastings Elwin, Esq., and Evan Baillie, Esq.; that Mr. George Stephenson has been appointed engineer to the company, and has especially undertaken the management and completion of the railway; and that Captain Denham, R.N., late marine surveyor for the port of Liverpool, has been appointed marine surveyor to the company, to carry into effect the intended improvements in the harbour of Wyre.

In consequence of these and other new arrangements, all the works on the railway, including the embankment at the Wyre terminus, are proceeding with vigour, so that the whole line will be opened about the month of May next year,—by which time also a very considerable part of the proposed improvements in the harbour will have been executed. Among these will be three lighthouses and a complete line of buoys, to enable vessels to enter the harbour at night as well as in the day; the cutting away of several projecting points in the rivers, the dredging off of some inequalities in the bottom of the channel, and rendering the channel straight from sea into the harbour, and the construction of a commodious landing wharf or quay, for the immediate accommodation of steamers and other regular traders.

According to the resolutions of the general meeting already mentioned, the directors have taken every means to ascertain the rate at which it would be most advisable to issue the new shares under the Act just obtained. The result of their inquiries has led them to determine that the new shares should be of 25*l.* each, but entitled to the same advantages as

the old 50*l* shares; the holders of the old shares to have a right of pre-emption of the new shares, thereby affording them the option of securing the advantages which it has been found advisable to give to the new shares.*

The directors have great satisfaction in stating that the original expectations of returns from the various sources upon which the undertaking was based, have been considerably increased, not only by the general augmentation of commercial and social intercourse, but also by several circumstances which have since occurred or were not originally contemplated.

Steamers from Dublin, Drogheda, Belfast, and the Isle of Man, may be said to be already insured as regular periodical traders to the Wyre, and there is every reason to expect the same from Dundalk and other eastern ports of Ireland; and from Glasgow, Ayr, and other places on the western coast of Scotland. A steam ferry-boat to the opposite side of Morecambe Bay will also be established, both for the local traffic of that district, and to convey passengers to the lakes, to which the company's railway will form the best route from the whole of the south, the east, and the west of England.

Foreign vessels with timber, flax, &c., already frequent the Wyre; and the demand for timber has so much increased, that the timber company established there are doing a very considerable business, and could easily dispose of a much larger supply. The extremely low rate of the dues at the Wyre must cause a similar influx of American vessels with cotton, tobacco, flour, and other produce for the supply of Preston, Wigan, Bolton, and the adjoining populous and important manufacturing districts, which can be supplied by the company's harbour and railway at a very much lower rate (arising from lighter port-dues, from much lower charges for carriage, and from greater proximity), than by the present channels.

Fleetwood (on Wyre) has just received the important privilege of being constituted a separate port, with full privileges of bonding, &c.

Fleetwood must likewise become an important fishing-station, for the supply of every kind of valuable fish to the manufacturing districts, as soon as the railroad is open, since it is evident that the numerous fishermen of the Isle of Man and of the neighbouring western shores, instead of incurring the expense and delay of carrying their fish to Liverpool, will resort to Fleetwood, from whence it will be conveyed with infinitely greater economy and despatch to all the numerous and extensive markets of the great towns of the neighbourhood.

Independent of these commercial advantages, it cannot have escaped the observation of those who have visited Fleetwood, even in its present infant state, how admirably it is adapted to supply the want, which has been long and extensively felt in the north of Lancashire, of some convenient place on the sea-coast to which the families of the great manufacturing towns might resort in the summer season for health or recreation. The extraordinary extent and firmness of the sands, the easy access from the shore, and the favourable local peculiarities of the shore itself, present advantages for this purpose absolutely unknown on any other part of that coast. And the formation of a watering-place on a large scale will unquestionably be one of the earliest consequences of the completion of the railroad. In addition to the large amount of traffic which the railway will derive from

* 24th July. The sum required for the completion of the harbour and railway works is already secured within a very small amount, the old shareholders and the directors and their friends having immediately subscribed for a very large proportion of the new shares necessary for that purpose.

this circumstance, Blackpool, although possessing but a very inconvenient access by means only of the common and indifferent roads and conveyances, is already visited by upwards of 20,000 different persons every season, nearly the whole of whom (besides the multitude of *new* visitors who will be induced to come by the cheapness, convenience, and rapidity of the railroad) would certainly proceed to Blackpool by the company's railway as far as Poulton, which is only four miles from Blackpool, since that conveyance would save them two-thirds of the time and one-fourth of the cost of the present coaches from Preston.

It is in contemplation to form a railroad from the opposite side of Morecambe Bay, along the coast, to Whitehaven and Maryport and thence to Carlisle and Glasgow, to communicate with the company's railroad by means of a large steam ferry-boat, and there is every prospect that the project will be carried into effect.—Indeed, a company has already been formed, and the works are actively proceeding, for the part of that line from Maryport to Carlisle. This would render the company's harbour and railroad the great route from London and the south and west of England to all the important north-western districts of England and Scotland, by means of the continuous lines of railroad which do already, or will when completed, branch out in every direction from Preston and the great lines southward and eastward.

All this shows that the undertaking has only to be completed to realize the most sanguine hopes of its projectors, and the directors feel themselves warranted in congratulating the shareholders on the gratifying prospect afforded them by the foregoing circumstances.

25th June, 1839.

P. HESKETH FLEETWOOD, *Chairman.*

COPY OF A LETTER WRITTEN BY THE SECRETARY TO GEORGE STEPHENSON, ESQ., NOW ENGINEER TO THE COMPANY.

*"Preston and Wyre Railway and Harbour Company,
11, King William-street, 5th June, 1839.*

"DEAR SIR,—The Directors are very anxious to obtain your opinion on the prospects of the Preston and Wyre Harbour and Railway; and although they are aware that you cannot yet be prepared with an extended professional report, embracing all the details of the subject, they believe that the minute attention you have paid to the works now in progress, as well as to those projected under your superintendence and that of Captain Denham, will have enabled you to form a safe opinion as to the ultimate prospects of the enterprize, as a work of national and local utility and of fair advantage to the subscribers. The directors do not, under present circumstances, feel qualified to recommend the plan to their friends or to the public without a knowledge of your sentiments as to its ultimate safety as an investment of capital.

I am, dear Sir, yours very truly,

"George Stephenson, Esq."

J. POWER, *Secretary.*

COPY OF MR. STEPHENSON'S REPLY.

"35½, Great George-street, Westminster, June 6th, 1839.

"DEAR SIR,—In reply to your letter of yesterday, intimating the desire of the directors to learn my opinion respecting the Preston and Wyre Railway and Harbour, I beg to say that the harbour possesses many and obvious advantages, which, combined with its position, fairly entitle it to become the resort of steam and other vessels maintaining the communication between Belfast, Dundalk, Drogheda, and other ports of the north-east coast of Ireland, as well as the Isle of Man, Glasgow, and other places in

Scotland, and with a large portion of the manufacturing districts in Lancashire by means of the railroad now being constructed by your company.

"This railroad, in connexion with others already completed or in rapid progress of completion, will render the town of Fleetwood accessible to a vast manufacturing population; and from its qualities as a watering-place, it cannot fail, in my opinion, of being resorted to by considerable numbers on that account. Moreover, it must not be omitted, that a railway will be formed along the coast to Carlisle and Glasgow, whilst the enormous cost of completing the railway, as proposed, across Morecambe bay, may in all probability defeat that measure altogether; in which case, your railway, in connexion with the steam-boats from the Wyre to the Duddon sands, would constitute the quickest mode of communication with the north-west coast of England and Scotland.

"In my opinion, therefore, this railway, if judiciously managed and fairly brought into play by means of other lines, together with the harbour, will offer many and great advantages to the public, and will ultimately prove a beneficial concern to the proprietors. I remain, dear Sir, your most obedient servant,

(Signed)

"GEORGE STEPHENSON.

"John Power, Esq., Secretary to the Preston
and Wyre Railway and Harbour Company."

LANCASTER AND PRESTON JUNCTION RAILWAY.

Third Annual Meeting, held at the Town Hall, Lancaster, on the 19th June, 1839; GEORGE BURROW, Esq., in the chair.

REPORT.—In conformity to the Act of Parliament, the directors have convened this meeting of the proprietors, to report to them the proceedings of the past year.

The directors have the pleasure to inform the shareholders that all the land required for the line of railway and stations has been contracted for, and is now in possession of the company; but as a few titles are still incomplete, there remains about 3,600*l.* to be paid on this account. The works on the line are so advanced that the directors feel confident their original intention of opening the railway to the public in the summer of 1840 will be realized. Mr. Perry, who took the Lancaster contract, having failed to provide materials sufficient to enable him to employ men to proceed with the works, so as to keep pace with the engagement to open the railway early in 1840, the directors were under the necessity to aid him with funds to the extent of 3,758*l.* 8*s.* 4*d.*, for which amount they have a security on the whole of his materials: notwithstanding this assistance, the works still proceeded so slowly that the company have been obliged to resort to that provision of the contract which empowers them under such circumstances to provide the materials which were still requisite, and employ an additional number of men to carry on the works with due activity. For the state of the works, the directors refer to the report of their engineer, Mr. Locke. The extensive works in the neighbourhood of Galgate requiring a great number of labourers, the want of accommodation obliged the directors to erect six houses, at a cost of 579*l.* 7*s.*; these, if not hereafter requisite for the use of the company, may easily be disposed of. By an agreement made with George Jackson, Esq. at the time of obtaining the Act of Parliament, it was provided that compensation for such special damage, if any, as might be caused to his mansion and grounds, at Barton, should be assessed by arbitrators appointed for that purpose; this has been done, and, according to a most unexpected award, the directors have had to pay 1,500*l.*

A survey having been made, with a view to continue the line of railway north of Lancaster, the directors, feeling the important advantage which will accrue whenever that is accomplished, followed the example of other companies, and contributed towards the expense the sum of 50*l*.

In the last report it was anticipated that the number of passengers to Lancaster would be considerably increased when the line of railway from London to Preston was open; this opinion has been fully realized, additional accommodation by canal and coaches having since been provided to the extent of 200 passengers per day.

At a special meeting held on the 9th April, permission was granted to empower the company, to take up on mortgage, in accordance with the Act, money to the extent of 83,000*l*.; the directors have accepted offers for the whole amount at 5 per cent. per annum interest for the term of three years, of which 62,800*l*. has been received.

Calls to the extent of 30*l*. per share have been made upon the proprietors, and the directors have great pleasure in having (as will be seen by reference to the accounts) to report a very small amount of arrears.

The directors cannot close this report without expressing their unabated confidence that the Lancaster and Preston Junction Railway will be a prosperous undertaking.

Statement of Account.

<i>Dr.</i>	<i>£.</i>	<i>s.</i>	<i>d.</i>
To works	52,890	0	10½
Land and houses, including severance and compensation to tenants; also land for stations, and other property	47,820	17	8
George Jackson, Esq., for view, per award	1,500	0	0
Law, including references, conveyances, Parliamentary expenses, counsels' fees, stamps, and other law charges	3,573	4	5
Surveying	298	9	4
Engineering	1,323	19	2
Deputation and travelling expenses	120	6	11
Morecambe Bay Railway	50	0	0
Office expenses, including salaries, rents, taxes, stationery, advertisements, postages, &c.	684	14	4
Furniture, fixtures, &c.	16	8	9½
Direction	383	5	0
Galgate cottages	579	7	0
Peter Perry, an advance on materials	3,758	8	4
Rails and chairs for permanent way	10,824	19	1½
Police	129	11	0
Balance in bankers' hands	34,777	3	2
Ditto of petty cash book	26	12	1½
	£158,757	7	3
<i>Cr.</i>	<i>£.</i>	<i>s.</i>	<i>d.</i>
By balance	22,113	19	3
Cash on account of calls	73,055	0	0
Interest on calls paid	211	6	8
Ditto from bankers	35	5	2
Loan on mortgage	62,800	0	0
Sundries	541	16	2
	£158,757	7	3

	£.	s.	d.
Previously expended, as per report of 1837 . . .	5,564	0	3-
Ditto ditto 1838 . . .	43,722	19	3
Expended, as per report of 1839 . . .	123,953	12	0.
	<u>£173,240</u>	<u>11</u>	<u>6</u>

Total amount received on calls . . . 143,523 0 0

DEPOSIT OF 2*l.* PER SHARE.

Arrears on 1st call of 3 <i>l.</i> per share . . .	£30		
" 2d " 5 <i>l.</i> " . . .	50		
" 3d " 5 <i>l.</i> " . . .	50		
" 4th " 5 <i>l.</i> " . . .	375		
" 5th " 5 <i>l.</i> " . . .	700		
" 6th " 5 <i>l.</i> " . . .	2,235		
		3,440	0 0

Amount of calls due on shares, in hands of company, 94
previously forfeited, and 15 more now forfeited . . . 3,037 0 0

£150,000 0 0

N.B.—Arrears of calls received since the above account
was made up . . . 700 0 0

(Signed) GEORGE BURROW, *Chairman.*

*Engineer's Report, to the Directors of the Lancaster and Preston Junction
Railway Company.*

GENTLEMEN,—In submitting to you the following report of the state of the works on the Lancaster Railway, I will as briefly as possible describe the actual condition of the contracts, so as to enable you to form your own notion of the amount of work that has already been executed.

Beginning at Preston, under contract to Mr. Wilkie, the arches across Pitt-street and Bridge-lane are far advanced, that across Bleasdale-street is completed, and more than two-thirds of the side walling through this town is already built, and preparations for commencing the works on Messrs. Park and Stephenson's premises are about to be made. The embankment north of the side walling is finished, the bridge and approaches at the Fylde-road are in a forward state, and the arching through Mr. Dawson's yard is nearly completed. Across Aqueduct-street the piers are at the springing, and the cutting through Mr. Myers' land, north of this street, will be finished during the present week. The arches at Cadley Mill-dam, near the commencement of Mr. Mac Mahon's contracts, are built, and the embankment is approaching rapidly. For a considerable distance the cutting is formed, and further north, by Lightforth, a large quantity of earth has been thrown to spoil.

From Crow Hall also, the cutting is being made, and the earth carried to the Barton Brook-valley, where the foundations of the river bridge are being prepared; between this and the White Horse much spoil has been thrown out, and the embankments at the river Brock and at Anderton Fold are proceeding rapidly. In the above districts several bridges and culverts are in progress. The long embankment at Mr. Brockholes' is being formed from the cutting near to Barnacre, where also the permanent road is begun to be laid. The quantity of earth to be carried to this embankment is 70,000 cubic yards.

Between the cutting just named and Woodacre, passing by Lingart, the road is already prepared, and partly ballasted, and the permanent way will here be soon commenced.

The cutting at Woodacre-wood is being carried to the Wyre embankment on the south, whilst that at Cleveley is passing from the north. The Wyre embankment requires from the former 66,000, and from the latter, 70,000 cubic yards.

The bridge of six arches across the Wyre is much advanced. All the piers are up to the springing, and the centres are fixed for turning the northern arch. A steam-engine has been erected by the contractor at Cleveley to facilitate the cutting there.

At this point the Lancaster contract, originally let to Mr. Perry, commences. The embankment at Spout House is considerably advanced by the cutting from Whinny Brows, and within the last few days the line has been formed from Foxholes, by the Hole of Ellet, into the Hampson-green cutting, so that for the future this embankment will proceed from both ends.

A large quantity of spoil has been thrown out at Hampson-green, and in the small hollow to the north of the line has been formed.

The cuttings on each side of Galgate are proceeding as rapidly as may be. The material is hard, and therefore the same progress is not made here as in other places.

The embankment at Leach-house is almost finished, so also is the cutting and embankment up to Scotforth, a portion only remaining on Mr. Redmayne's land, for completing the Galgate embankment.

At Scotforth a considerable amount of spoil has been made, and the embankment past the Greaves is now formed up to the field where the station is to be made. A large portion of the remaining earth in Scotforth is believed to be fit for ballast.

The bridges in this district are in a tolerably forward state, and although considerable delay necessarily took place, consequent on Mr. Perry's inability to proceed with the works, and on the new arrangement which it was found necessary to make, still these being completed, the future progress may now be more certainly depended upon.

With the general progress and appearance of the works I am well satisfied. There are some parts of the Lancaster contract which you are aware have been disapproved, and on which some difference of opinion has arisen; it will be my duty to see that the stability of the works be not impaired, and that they are executed with the strictest economy and with due despatch. More than two-thirds of the entire number of the bridges are in various states of forwardness, and nearly one-half of the whole quantity of excavation is removed.

There is no embankment requiring more than 70,000 yards at one end; and, judging from what has already been done, the means now at our disposal, the favourable period of the season, and the great activity observable throughout the entire line, I look forward with confidence to June, 1840, as the period at which the line may be opened to the public. To this end you may rely on my exertions, and I remain, gentlemen, your obedient servant,

JOSEPH LOCKE.

Lancaster, June 18, 1839.

LIVERPOOL AND MANCHESTER RAILWAY.

FIFTEENTH HALF-YEARLY MEETING.

REPORT.—The directors beg leave to lay before the proprietors their

statement of accounts for the six months ending the 30th June last; by which it will be perceived, that the aggregate receipts are very nearly the same as those of the corresponding period of last year, the receipts in the merchandise department being considerably less than those of last year, while those in the coaching department are more, to about the same extent.

The proprietors will recollect, that in the early part of the year 1838, an extraordinary amount of traffic was brought on the railway, owing to the stopping of the canals, by the severe and protracted frost of that period. During the last six months, not only has the railway not had the advantage of any unusual frost, but in some departments of trade it has had to contend with a period of extraordinary depression.

In the coaching business, this partial stagnation in commerce and manufactures has been less severely felt; and the accession of traffic brought on the line from the North Union Railway, which, in the coaching department, is now in full and prosperous operation, has helped to increase the receipts in that branch of the company's business.

Since the meeting of proprietors in April last, the Act has been obtained for making the proposed junction line between the Liverpool and Manchester Railway near Cross-lane, and the Manchester and Leeds Railway near Hunt's Bank. The directors feel themselves pledged not to commence operations upon the actual construction of this extension line, without coming again before the proprietors for their sanction to the measure. In a work of such magnitude, the fullest and most deliberate consideration is requisite, before committing the company to the large outlay involved in the undertaking. In the present state of the money market, and considering the serious depression under which some important branches of the commerce of this district now labour, the directors have felt that it would not be expedient to call on the proprietors on the present occasion to come to any definitive resolution on the subject. At a more favourable juncture, and when further time has been allowed to the shareholders for a calm consideration of the whole question, the directors propose to call a special meeting, for the purpose of receiving from the proprietors their final instructions.

Liverpool, 24th July, 1839.

The following is a statement of the

Receipts and Disbursements for the Half-year ending 30th June, 1839.

RECEIPTS.				£.	s.	d.
Coaching department	.	.	.	67,691	18	7
Merchandise do.	.	.	.	52,964	13	0
Coal do.	.	.	.	3,157	15	1
				<hr/> £123,814 6 8 <hr/>		

EXPENSES.				£.	s.	d.
Bad debt account	.	.	.	172	0	3
Coach disbursement, do.	.	.	.	9,418	0	7
Carrying do. do.	.	.	.	12,076	15	5
Coal do. do.	.	.	.	625	6	7
Cartage (Liverpool) do.	.	.	.	184	12	1
Do. (Manchester) do.	.	.	.	3,792	16	11
Charge for direction, do.	.	.	.	394	16	0
Compensation (coaching) do.	.	.	.	359	16	5
Do. (carrying) do.	.	.	.	581	17	0

Coach-office establishment do.	800	12	4
Engineering department do.	200	0	0
Interest and rent do.	4,658	4	9
Locomotive power do.	24,788	5	1
Law disbursement do.	150	0	0
Maintenance of way do.	4,777	8	1
North tunnel disbursement do.	863	3	10
Office establishment do.	1,212	19	10
Police do. do.	1,091	19	10
Petty disbursement do.	65	0	0
Repairs to walls and fences do.	1,425	15	5
Stationary engine disbursement do.	941	10	7
Tunnel disbursement do.	474	16	2
Tax and rate do.	2,678	19	5
Wagon disbursement do.	3,867	10	6
		75,602	7 1

Nett profit for half-year ending 30th June, 1839 . £48,211 19 7

Statement of Receipts and Expenditure on Capital Account, from the commencement of the undertaking to 30th June, 1839.

The TREASURER Dr.	£.	s.	d.
To amount of joint capital in shares and loans	1,390,112	13	0
Dividends not paid	1,148	16	7
Reserved fund and interest	4,204	14	8
Surplus in hand after payment of the seventeenth dividend	5,089	15	8
Nett profit for the half-year ending the 30th June, 1839	48,211	19	7
	£1,448,767	19	6

The TREASURER Cr.	£.	s.	d.
By amount of expenditure on construction of the way and works	1,389,035	19	6
Arrears on calls	893	6	6
In the hands of Messrs. Moss and Co., bankers, viz. :—			
Reserved fund and interest	£4,204	14	8
Balance	29,756	14	7
	33,961	9	3
Balance of book debts due to the company	24,877	4	3
	£1,448,767	19	6

By the foregoing statement it appears that the nett profits for the half-year amount to	£48,211	19	7
To which must be added	5,089	15	8
Balance from the last half-yearly account, and making a disposable sum of	£53,301	15	3

The number of shares and amount of instalments entitled to a dividend out of the general profits are as follow :—

The old shares as heretofore	7,968 ⁷ / ₁₆	£100 shares.
On the new shares sold, according to the Act	136 ⁷ / ₁₆	£100 shares.
On five instalments, amounting to £35 per share, on 7,968 £50 shares	2,788 ¹⁸ / ₁₆	£100 shares.

Making a total of 10,894¹/₁₆ £100 shares.

On this number of shares the directors recommend a dividend of 4*l.* 10*s.* per share, amounting to 49,023*l.* 4*s.* 6*d.*, and leaving a balance of 4,278*l.* 10*s.* 9*d.* to be carried to the credit of the next half-year's account.

CHARLES LAWRENCE, *Chairman.*

N.B.—A dividend of 4*l.* 10*s.* per £100 share having been declared by the proprietors, the treasurer will be prepared to pay the same at the Railway Office, Lime-street, between the hours of Eleven and Three, on and after Tuesday, the 6th of August next; or the amount will be made payable at Messrs. Barclay and Co.'s, London, or will be remitted in a bill at a month, at the proprietor's option; and the dividends of parties who have given their orders, will be paid in conformity with such orders; and if the proprietor be a holder of new £50 shares, the call of 5*l.* per share must be liquidated at the same time, and the balance paid or received as the case may be.

CHELTENHAM AND GREAT WESTERN UNION RAILWAY COMPANY.

Fifth Half-yearly General Meeting of Proprietors.

At the Fifth Half-yearly General Meeting of the Cheltenham and Great Western Union Railway Company, held in pursuance of the Acts of Parliament, at Cirencester, on Wednesday, the 1st day of May, 1839; WILLIAM HENRY HYETT, Esq., in the chair, it was resolved,

First,—That the Report of the Directors now read be received and adopted; and that they be requested to have it printed and circulated among the proprietors.

Second,—That the common seal of the Company be affixed to the register of proprietors now produced.

Third,—That the Directors be authorized to deliver shares which shall have been declared forfeited by them, as soon as possible, to the subscribers for the 1,500 shares.

Fourth,—That Mr. Hyett, Mr. Lewis, and Mr. Cripps, be re-elected Directors of the Company.

Fifth,—That the thanks of the Meeting be given to the Directors for their zealous and valuable services.

W. H. HYETT, *Chairman.*

Mr. Hyett having quitted the chair,

A vote of thanks to him, for his able conduct, was carried by acclamation.

REPORT OF THE DIRECTORS.

Since the last General Meeting, contracts have been made for the formation of the line from the Barnwood road to the Gloucester depot, and also for sinking the permanent shafts, in the Saperton Tunnel.

All these Contracts have been satisfactorily let to responsible parties.

By the amended Act of last session, it was provided, that all the land re-

quired for the railway, between the depots of Cheltenham and Gloucester, should be purchased and paid for on or before the 25th of March last, which enactment has been fully carried into effect.

The Contracts, for the execution of this part of the line, expire in March, 1840; and from the progress made during the winter, and the very unfavourable season during which the works have hitherto been carried on, there can be no doubt of the ability of the Contractors to complete their works within the prescribed period.

About 160,000 cubic yards of earth have been excavated during the past winter, and there remain about 460,000 to complete. The masonry and brick-work are in an advanced state. The ballasting for the permanent way is also preparing, and your Directors have taken measures for securing an ample and early supply of such of the other materials as require time to prepare, so that no delay may hereafter occur in completing this important part of the work.

Every preparation is making for proceeding with the construction of the depots at Cheltenham and Gloucester; in the arrangements of which your Directors propose to study every possible economy, consistent with the accommodation of the public, on a part of a line where so very large a traffic must ultimately be provided for.

Of the $17\frac{1}{2}$ miles from Cirencester to Swindon, the land on $15\frac{1}{2}$ miles has been contracted for, and a large proportion has been taken possession of and paid for. The works on this portion, which had been let just before your last Meeting, have been commenced at different points, as rapidly as the land required could be procured, and are now proceeding satisfactorily; and your Engineer has no reason to doubt that they will be completed by the periods fixed in the Contracts, which all expire in the latter end of 1840. These periods are calculated so as to allow of the whole distance from Swindon to Cirencester being opened simultaneously, or as nearly so as possible, with the opening of the line of the Great Western Railway from London to Swindon. Upon this district, as upon that between Cheltenham and Gloucester, although commenced later, and consequently not proportionably advanced, it is satisfactory to be able to state, that as much has been done as the season and other circumstances could allow of, and that the works are in that state, which admits of the full advantage being taken of the more favourable period of the year which we have now entered upon. Five of the permanent shafts of the Saperton Tunnel are proceeding very satisfactorily: three of them have already reached rather more than half the required depth, and the other two about one-third—no difficulties have been experienced, and at present there is every appearance of the materials through which the tunnel itself will be excavated, being as favourable for this work as was originally anticipated. The sixth shaft will not be so deep as the others, some difficulty has occurred in procuring the land, but there is now every prospect of this cause of delay being speedily removed, and that all the shafts will be ready by the autumn of this year—so that the tunnel may be commenced as soon after as may be desired. The preparatory measures necessary for setting out the works and determining the land required in the Stroud valley, have been put in hand, and are nearly completed.

The Directors have agreed with the Birmingham and Gloucester Railway Company for the purchase of about four acres of land at Gloucester, near the cattle-market, for their depot at Gloucester.

It was provided by the Act of Parliament, that there should be a principal depot at Cheltenham, for the joint use of both Companies, to be formed at the expense of this Company; and a similar depot at Gloucester, to be formed at the expense of the Birmingham and Gloucester Company; but it has been apprehended that, under the particular circumstances, much confusion and inconvenience might result in practice from that arrangement, and the Directors

of the two Companies have therefore come to an agreement to have distinct depots at both places, to be formed separately by each Company—an arrangement which will contribute greatly to the facility and regularity of management in the traffic of both lines.

The Directors have exercised their power of declaring forfeit 918 shares in the hands of parties whom they ascertained had not the means of payment, in addition to the 531 shares the forfeiture of which was confirmed at the last General Meeting. The three months' notice of forfeiture required by the Act not having expired, the declaration of forfeiture cannot be confirmed at the present Meeting; the Directors have, however, considered that it might probably have an injurious effect upon the value of the stock of the Company for a considerable period if these shares were suddenly thrown upon the market, and that many of them might, by that means, get into merely speculative hands—they determined therefore to use every exertion to place them in the hands of persons of unquestionable responsibility, and they have the greatest satisfaction in reporting that they have obtained the signatures of most respectable subscribers to an agreement to take and hold, for a period of at least twelve months, shares to the extent of 1,500—an arrangement much more favourable to the Company than any other disposition which could have been made under the provisions of the Act of Parliament. The Directors require the sanction of this Meeting, for the delivery of the shares to the subscribers for them, as soon as they can be obtained.

This operation affords strong grounds for congratulation and encouragement, not only in the substitution of thoroughly responsible holders for 1,500 shares, for persons unable to pay the current calls—but with reference to the period during which it has been accomplished—while considerable uneasiness has existed, from various causes, in the money market, and while all railway shares have been under unexampled depression—affording, as this does, strong evidence of the opinion entertained of this important undertaking, and the interest felt in the completion of it by persons of competent judgment and ample means.

The Directors are not aware of any ground, as respects this undertaking, for the shares bearing a lower price than they have borne at any former period. On the contrary, their conviction that an ample revenue will result to the proprietors on the completion of the line remains unshaken.

The proprietors are reminded that the railway from Cheltenham to Gloucester will be opened by June, 1840; and from Cirencester to Swindon, in a few months afterwards; that the Company will then be entitled to payment, by the Birmingham and Gloucester Company, of a moiety of the outlay between Cheltenham and Gloucester; that they will also be in a position, when a moiety of their capital is paid up, to raise the loans they are empowered to borrow under their Acts of Parliament, and that this Company will be most favourably circumstanced for raising such loan at that period, as more than half the railway will then be producing, or, on the eve of producing, a return upon the capital expended.

It cannot be reasonably anticipated that those parts of the line which may be ready for traffic will afford such return in any proportion to that which will result from the completion of the entire line; but they will afford such an income, even should it be deemed expedient to resort to the alternative of accepting the offer of the Great Western Company to rent the line between Cirencester and Swindon, as must re-establish the value of the shares in the estimation of the public.

The Directors have decided, by ballot, amongst themselves, pursuant to the provisions in the Act of Parliament, the members to retire from the Board, and report that Mr. Hyett, Mr. Lewis, and Mr. Cripps have been balloted out, and that they are eligible for re-election.

W. H. HYETT, *Chairman of the Directors.*

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CHELTHENHAM AND GREAT WESTERN UNION RAILWAY COMPANY.

Statement of Accounts from 24th of June, 1838, to 25th December, 1838.

RECEIPTS.	£	s.	d.	£	s.	d.	£	s.	d.
Amount of capital received on account of deposits and call, with interest on arrears, as per last statement							57,763	17	0
Amount of capital received, on account of call, from 24th June, 1838, to 25th December, 1838				33,322	10	0			
Interest on ditto	236	12	6						
Less discount allowed on payments in advance	166	10	3	70	2	3			
Fees on registration or otherwise				0	5	0	33,392	17	3
							91,156	14	3
EXPENDITURE.	£	s.	d.	£	s.	d.	£	s.	d.
Payments to 24th June, as per last statement				45,932	14	5			
Engineering	1,983	18	2						
Parliamentary expenses on obtaining amended Act ..	1,574	16	6						
Law charges	654	15	11						
Printing and advertisements .	140	18	3						
General disbursements, consisting of direction, office expenses, salaries, postages, parcels, hire of committee-rooms, and incidental expenses	1,129	12	11						
Land and compensation	17,231	3	0						
Contracts for works	2,159	19	0						
				24,875	3	9	70,807	18	2
							£20,348	16	1

W. H. HYETT, *Chairman.*

SCIENTIFIC AND MISCELLANEOUS INTELLIGENCE.

Fire Rotary Engine.—The report of this machine, by M. Galy Cazalet, is given by the commissioners mentioned in our last, in the words of the author, without any comment or observation. "The machine which I submit to the Academy has none of the necessary mechanical organs actually in use, and its simplicity appears to me to offer the double advantage of preserving to the mover nearly all its power, and to eliminate in a very great degree the causes of derangements. Setting out from this consideration, that the principal loss of power in steam-engines arises from the waste of caloric developed in the fire-place, and which is passed across the walls of the boiler to vaporise the water, I have had an idea of employing immediately the power of the fire, or of the gaseous products proceeding from combustion. My calculations, based on the supposition that the increase of the gaseous volume is uniform up to 800 degrees, have conducted me to

this conclusion,—that the caloric developed by a kilogramme of burning coke in the fire-place of a boiler, gives to the concentrated flame in the fire-place three times the power which the vapour corresponding possesses; so that the actual machines which utilise only $\frac{1}{3}$ of the power of the vapour, utilise only $\frac{1}{9}$ of the power of the flames. Admitting, then, $\frac{1}{3}$ loss in my apparatus, of which the fire is the motive power, we should obtain still three times more useful effect than the actual machines give." We, some year or two since, heard of a project in England much analogous to this, namely, to employ the fire directly, without the intervention of any other agent, as water or vapour; but we believe there was a hitch in the practical application of the idea, which hung up its consummation. We hope M. Cazalet has been more successful.

New Steam Safety Boiler.—A long report has been made to the Academy of Sciences, by a commission, consisting of Arago, Dupin, d'Arcet, Seguiet, and Savary, on a steam-boiler of M. Bealay. The advantages attributed to this boiler are, facility of repairs, a combustion sufficiently active, exemption from smoke, an abundant production of vapour, and the absence from all danger from ordinary explosions. It would appear that this boiler is adapted for fixed engines only; for it is described to consist of the trunk of a chimney in bricks, the fire in which occupies the lower part, and the walls support, firmly fixed, about three metres from the ground, the body of the boiler, which is a horizontal iron-plate cylinder, from whence issues some vertical tubes slightly conical, descending in the chimney to near the bars of the grate, and immersed in the thick bed of burning coke about two decimetres. A little above the fire, the interior of the chimney is divided into vertical compartments by thin brick partitions, and each boiler tube is isolated in a compartment in another tube, which, in a great measure, it fills. The heated air in these tubes gets a passage the more contracted the higher it ascends. It travels round the boiler in a fine film (veritable *étranglement*), and escapes at last in a short chimney of iron plate covering and surmounting the apparatus. From the grate bars to the top of the chimney is about five metres. Much advantage is said to arise from this construction. The vertical tubes are said to accelerate the draft, and the hot air always surrounding the boiler tubes, to dispose fruitfully of its superfluous heat as it rises. These tubes are said to accelerate the circulation of the water, and to contribute much to the efficiency of the apparatus. Two of them go from towards the bottom of the body of the boiler, and carry the water to near the bottom of the boiler tubes, and a third takes the vapour from the top of these to the upper part of the main body of the boiler. An ingenious contrivance is made to clean the boiler tubes. At the bottom they are fitted with copper caps, which are pressed closely against them by a bar passing through the main body of the boiler itself, to the top, on which is a ball, the unscrewing of which unfastens the caps. As the exterior part of the boiler tubes, they say, acquires a higher temperature than the bar traversing the water does, it expands more than the bar, and thereby keeps the caps to the tubes the tighter the higher the temperature.

This contrivance of the cap is made also to prevent the effects of explosions. It is composed of two parts, one brazed to the other. If the water should become deficient in the boiler, and by consequence afterwards in the tubes, the cap, surrounded with the ignited fuel, will heat excessively, the solder will melt, and the lower part of the cap be projected into the fire. Within an hour a new cap can be put on. Several artificial explosions, the commissioners say, were made in their presence, without the slightest accident, and with scarcely shaking the boiler, and the reparations

made before their faces. To inform, however, the engine-man when the water has sunk to a certain limit, a float, by means of a rod, opens a passage to the vapour, which escapes with a violent whistling.

The commissioners say they have witnessed the performances of this boiler of a four-horse power, and that its average evaporation was 7·1 kilogrammes of water for every kilogramme of coke used, which they consider beneath what the boiler will do under the most favourable circumstances. The consumption of coke was 31 kilogrammes per minute, and they compute from direct experiment, that 13 cubic metres of air was consumed in the combustion of 1 kilogramme of coke; "15 metres are nearly the minimum admitted for the most advantageous fires."

Transference on Stone of Ancient or Modern Impressions.—M. M. Paul and Augustus Dupont, have invented a method of transferring on stone impressions of any age, without any detriment to the original copy. They have exhibited specimens from the wood engravings of Albert Durer, and from books printed in the 16th and at the end of the 15th centuries.

Mock Suns.—About a quarter or ten minutes to five, A.M., July 11th, one of these phenomena appeared. The sun itself was almost wholly hid behind a cloud; and at about 20 degrees from it south, in the same horizontal plane, was a mass of vivid light of an irregular oval shape, the major axis being vertical, and about double the minor. In the middle was the disc, nearly covered with a thin strip of black cloud, the image itself being evidently formed by a more distant and whiter cloud. The whole phenomenon was strongly tinged with some of the prismatic colours, having the red on the side nearest the true sun; but we did not perceive any traces of the purple colours, nor, indeed, scarcely any of the green.

Electro-Magnetic Telegraph.—We understand the Great Western Railway Company have laid down a telegraph of this kind from the Paddington station to Drayton.

Concentric Steam-engine.—Messrs. Bunnett and Corpe have patented a steam-engine, the principle of which is a piston oscillating like a pendulum about a centre, in a cylindrical segment steam-chamber, instead of a cylinder. The piston itself is quadrangular, on Barton's patent expanding principle, and the piston-rod a square bar bent into a circle, and working through two stuffing boxes with metallic packings. This circular rod is supported by two arms exactly opposite to the piston. From the point of support a rod working on a pin passes to the fly-wheel, with which it is connected by a pin at the same distance from the fly-wheel's centre, which is placed somewhat higher than that of the piston. As the piston oscillates the fly-wheel revolves, and the whole machinery is driven.

This is the outline of the invention, of which the patentees, naturally enough, think highly, and from which they expect much. It requires no sagacity, however, to perceive that the invention has all the disadvantages of a common reciprocating engine, with few or none of its advantages. In the first place, the obliquity of action must be the same as that in the common cylinder, if not greater; and generally the useful effect will be drawn from the power diminished by a double instead of a single obliquity. The nearer the dead points the more marked this will be. Again, the piston itself having to get through a circle, will, it would seem, consume also a greater quantity of steam to produce one revolution of the fly-wheel, that is, a given effect, than if it moved in a direct line. To this may be added, the unequal wear and tear of the piston and steam-chamber, from the unequal friction, and many other minor objections. Much ingenuity has no doubt been displayed in the invention; but it is an ingenuity whose

effect, it is to be apprehended, has been more for the disimprovement than the improvement of the steam-engine.

Society of Arts.—We understand Mr. Baddeley has the honour to be publicly recommended by the editor of the *Laughingstock Magazine*, to succeed Mr. Aikin as secretary in the Society of Arts. We know not Mr. B., who may be a very deserving man; but, oh! such a patron. Can it be honourable or advantageous to Mr. B. to be openly recommended by the editor of the threepenny weekly—by one who publicly avows that “a lie current and uncontradicted for a week, is as good for all purposes of present effect as the best truth ever promulgated?”

Westminster Sewage.—In connexion with this subject, the readers of the “*Railway Magazine*” will have observed, in former numbers, some remarks on the valuable papers presented as a prize essay to the Institution of Civil Engineers, by Mr. Jones, of the firm of Jones and Lomax, of Great Scotland-yard. It will be recollected that these papers consisted of an essay on the sewage of the metropolis, a book of explanatory drawings, and other documents; and a large and beautifully finished map of the city of Westminster, exhibiting the various ramifications of the sewage, and presenting at one view the whole system of metropolitan drainage.

This map now occupies a conspicuous position in the handsome library of the institution, and we have much pleasure in recording the fact, creditable alike to the council and to Mr. Jones, that the highest prize awarded this session, was that of a Telford medal and twenty guineas to J. E. Jones, Esq., for his very interesting communication on the sewage of Westminster.

Wooden Roads.—In consequence of the success, we suppose, of the wood in Oxford-street, we perceive the Old Bailey is now being laid down with deal hexagonal blocks, nine inches long. These blocks, we understand, are cut, brought from Norway, and laid down, at the low rate of 9s. 6d. per square yard. We need not say that the timber alone ($6\frac{1}{2}$ cubic feet) cannot be furnished for the money, and that this contract must therefore be of that kind, that the more business the parties do, the quicker they must retire from it altogether.

Machine for Copying Oil Paintings.—M. Liepmann, a painter of eminence at Berlin, is stated to have invented a mechanical process for taking, in a very short time, a copy of any painting in oil, however old, with an exactitude which cannot be attained by the brush. M. Liepmann has exhibited his machine in the galleries of the Royal Museum at Berlin; and in the presence of the directors, made 110 copies of a portrait of Rembrandt, with the greatest success.—*Morning Herald*.

New Power in Projectiles.—A paragraph is going the round of the papers, in which the invention of a new combustible is mentioned, of such amazing power, that the explosion of $2\frac{1}{2}$ lbs. of it in a shell would produce an effect equal to that of the explosion of a large powder-mill. We do not deny it, but we must see it to believe it.

Oak Necessary to Build One Ship.—By the report of the Commissioners of Land Revenue, it appears that a 74-gun-ship contains about 2,000 tons, which, at the rate of a load and a-half a ton, would give 3,000 loads of timber, and would require 2,000 trees of 75 years' growth. It has also been calculated that, as not more than 40 oaks, containing a load and a-half of timber in each, can stand upon one acre, 50 acres are required to produce the oaks necessary for every 74-gun-ship.

REVIEW OF BOOKS.

We have received Mr. Buck's "Practical, &c., Essay on Oblique Bridges," and have a notice of it written; but we want space to insert it. We have also received "Pambour's Theory of the Steam-engine," and only want leisure to look into it.

Wyld's Great Western, Cheltenham, and Bristol and Exeter Railway Guide; with numerous Maps and Engravings.—This guide appears to be a complete compendium of information upon the Great Western Railway and its branches, and is illustrated with numerous engravings of the engineering peculiarities of the line. It is compiled from original sources and the best authorities, including (of course we may say it without presumption) our own.

RAILWAY NOTICES AND STEAM NAVIGATION, &c.

Arbroath and Brechin Railway.—It is intended to lay down a line of railway from Brechin to join the Arbroath and Forfar Railway at or near Friockheim. Messrs. Grainger and Miller, of Edinburgh, are to estimate the probable expense, towards which Lord Panmure has subscribed 50*l.*, the Town-council 30*l.*, the Guildry 20*l.*, and the Incorporated Trades 11*l.*

Brighton Railway.—The general meeting of this company was held at the London Tavern, July 18th, John Harman, Esq., in the chair, and the report was read by Thomas Wood, Esq., the secretary. This being done, several questions were put by Mr. Fowler relative to the contracts, from the answers to which, it appeared that they were all let, and that the total cost would not much exceed the estimate. Mr. Waley, in moving the reception, &c., of the report, commented severely on the conduct of those proprietors who had not paid up their calls, and urged that coercive measures should be taken against them. Mr. B. Todd was delighted at the amicable arrangement come to with the South-Eastern Company. Mr. Troup, a gentleman who had not paid up his calls, and who had written circulars to others not to pay them too, then occupied the meeting with a long string of questions, but the sense of the proprietors present was so entirely against him, that the worthy gentleman stood in the glorious minority, not of one, on Mr. Waley's motion, but of nothing; for not having paid up his calls, he was a cipher. The whole burthen of the honourable proprietor's complaint was, the being unable to have such accounts as he wanted; but, as Mr. Catley observed, were every proprietor to want as much as Mr. Troup they must keep five times the number of clerks they now did, and he was quite sure that any proprietor may obtain from their indefatigable secretary, Mr. Wood (a more courteous man than whom did not exist), any information he may want. Some discussion next took place respecting some shares sold by two proprietors, the purchasers of whom, not having registered, the directors were urging them, the original proprietors, to pay the calls on. A resolution being carried to enforce payment on defaulters, and a question put, the Secretary said in reply, if all arrears were paid up and existing liabilities discharged, there would be left a balance in hand of 116,000*l.* Some conversation then ensued about taking up money on loan, which it was decided to defer, the chairman observing that it was not intended to call up more than 45*l.* of the 50*l.* shares, 5*l.* of each share having been considered as paid up on the union of the companies. The Bishop of Chichester having appointed three clergymen to go among and afford religious instruc-

tion to the workmen, the sum of 100*l.* was voted unanimously in aid of the laudable design. Cordial votes of thanks were then voted by acclamation to the chairman and his colleagues, and the engineer, after which the meeting, which was unusually large, broke up.

There are unfortunately a set of persons who, obstinately tenacious of their own superior wisdom, conceive that the acts of others cannot be good unless approved by them, and it not unfrequently happens that these parties are most ignorant of the subject on which they presume to entertain opinions at variance with others of sounder judgment. The above meeting affords a practical illustration of this observation in the person of Mr. Troup. We believe this gentleman possesses a few acres of land on the sea-coast, on which he has had a few yards of cutting and levelling, and that he has been a trustee of a turnpike-road, on which there has been about 10,000*l.* of work done. With this *extensive experience* in earthwork, it would appear, he considers himself a better judge of cuttings and embankments, of estimates and contracts, than the engineers and the whole body of directors, whose time and energies have been devoted to the subject. His proceedings, in our opinion, savour much of a weakness of intellect; for his recommendation, if followed, would, we hear, ruin his own property. We would ask Mr. Troup whether, in every place in which he has been, and in every thing in which he has been engaged, or with which he has been connected, and in every situation he has occupied, whether he has not usually gone contrary to all others? He assumes to know more about turnpike-roads! more about the formation of harbours! more about the construction of railroads and of the internal economy of the company! than any other person! If it be really so, he is an extraordinary man. Nothing, however, can show the sense entertained of this gentleman's notions better than that the meeting of proprietors, which was a very numerous and respectable one, composed of some of the largest shareholders, floored his attack on the directors by unanimously receiving and adopting their very satisfactory report, and by as unanimously voting thanks to the chairman and directors for their efficient management of the company—proofs demonstrative of their confidence in the direction. We have somewhere heard of a story where a very worthy member of a body wished to carry a measure in which he stood alone, and after expending all his eloquence to bring the rest to his opinion, without success, emphatically, and in great good humour, exclaimed, "Well, I never met with such a set of obstinate fellows in my life." Perhaps Mr. Troup holds precisely the same opinion of the Brighton Railway proprietors? Much may be said on both sides about enforcing the payment of calls, but here is a weighty fact,—the proprietors permit, nay, authorize the directors to enter into engagements for works; should they not therefore be compelled to fulfil their own, without which the directors cannot go on? We recollect people grumbled and complained that the directors of this company were doing nothing; now some would say they are doing too much!

Bristol, and Exeter Railway.—The excavations for the bridge across the New-cut, near the cattle-market, for the Bristol and Exeter Railroad, have been commenced. There are now no less than five bridges, in the same neighbourhood and within a space of three-quarters of a mile, in course of execution, viz., three connected with the works of the Great Western Railway, the one above alluded to, and the Saint Philip's bridge.—*Bristol Mercury.*

A most beneficial effect, we understand, has been worked by the present depressed state of railway property on this company. Many of those individuals who purchased for mere speculation, have been obliged to part with

their shares, and the consequence is, they have fallen into more substantial hands, who, aware of the ultimate prospects of the line, are seizing the favourable opportunity to make them permanent investments. Some of the speculators however for a long discount, have been sadly bitten. The works are proceeding most satisfactorily, and the permanent way will probably be completed in twelve months, as the heaviest parts are contracted for to be finished next spring.

Birmingham and Derby Junction Railway.—This line will be opened to the public on the 12th of August. The works are in a forward state, and the junction with the London and Birmingham Railway, near the Hampton station, is nearly completed. A train of three beautiful locomotive engines and tenders, intended for this line, were brought by Mr. Grantham, of the respectable firm of Messrs. Mather, Dixon, and Co., of Liverpool, to this town, on the 4th July. These engines are on six wheels, and are a fine specimen of the perfection to which the science of engineering is now carried. They are similar in appearance to the well-known engines, the "Hornet," "Hawk," and "Vulture," on the Grand Junction Railway, which were all made at the same extensive works.—*Birmingham Journal*, July 6.

Birmingham, Bristol, and Thames Junction, and the Pneumatic Railway.—We understand the patentees of Clegg's Pneumatic Railway have entered into an arrangement with this company to lay down 1½ mile, on a single way of their line, the necessary apparatus of a tube, &c., to try the experiment with. The road is to be ballasted, and the necessary rails and apparatus laid at the sole cost of the patentees. They are to have eight months from the date of the agreement to complete and prove the experiment. If at the end of that time it succeeds, the railway company are to have the use of the patent gratuitously, paying, of course, the expense the patentees may have been at in laying down the way, if they shall choose to take to it. If it does not succeed, the latter are bound to clear all off in eight days after the proof of failure. A more favourable agreement than this to the company cannot be conceived; and in our opinion the directors have acted most wisely in accepting it. If the invention succeed, they secure the benefit of it to the company free of all patentee charges; and if it fail, they lose nothing. In the meantime they will have one line of way to themselves if wanted. So confident, however, are the patentees of success, that they are going, we hear, to the expense of about 14,000*l.* in the experiment. Our wish would be that they may succeed, but we must confess success on the whole length of this line, 2 or 3 miles, would not perfectly convince us of its success on a line of 30 or 100 miles long, for the reasons stated in our Number 41. The experimental way is to be carried up to and beyond the crossing of the Great Western line, so as to show the effects of a break in the apparatus. If, indeed, the Directors require it, it must also be continued up to the junction of the Birmingham Railway. A part of the line on which the experiment is about to be tried, has a gradient of forty-four feet per mile.

Birmingham and Gloucester Railway.—Requisitions have been presented by numerous shareholders to the directors to allow 4 per cent. interest on all calls, and on the sums paid, as soon as 50*l.* per share shall have been paid up. There is no doubt that the directors, who have ever shown themselves so alive to the true interests of this concern, will accede to a measure so calculated to benefit it.

Brandling Junction Railway.—The traffic on this line is rapidly on the increase, the receipts lately have been above three times the original estimate; the passengers between 600 and 700 daily. The other portion of

the line is approaching rapidly towards completion. The shares bear a premium of 10*l*.

Bolton and Preston Railway.—Several proprietors have signed a requisition to the directors that interest at 5 per cent. per annum may be paid half-yearly, upon the 20*l*. per share now paid up, as well as upon all future calls, as they shall be paid in.

Chester and Birkenhead Railway.—Compensation Case.—On the 15th July, a Sheriff's Court was held at the Egerton Arms, Bache-Pool, to assess the value of land situated in the townships of Newton and Upton, required for the railway. Messrs. Francis and James Dickson, of Chester, claimed from 1,400*l*. to 1,518*l*., as per witnesses, for 1 acre 2 roods and 17 perches of land, part of their nursery, and about a quarter of an acre of bog land, containing 550 loads, including damage by severance, &c., for which the jury awarded 606*l*. to Messrs. Dicksons.—Abridged from the *Chester Gazette*.

Commercial Blackwall Railway Bill.—The "Sun" of July the 10th, in commenting on the opposition to the second reading of this Bill in the House of Lords, remarks, "A railway touches the south-eastern end of London-bridge, to the great convenience of the public, and especially of the Borough people; but then the Borough people are not afflicted with the scourge of a corporation. Why should there not be a railway at the north-eastern and western point of London-bridge? . . . Because the corporation do not like. To the citizens, and to the commercial world at large, such a railway would be a great benefit." And further remarks that "the Blackwall Railway people are not wise in their generation; they should have secured the favour of the corporators by making it 'worth the while' of aldermen and deputies of wards. A few shares and other persuasives, judiciously applied among necessitous aldermen, or among the eloquent Liberals of the corporation, would have stopped all opposition to the Bill."

The case of this company was closed in Committee on the 26th, and counsel will reply on the 30th July.

Cheltenham and Great Western Union Railway.—Persons who have expressed their doubts of the intention of the directors to carry the line forward through Stroud, &c., to Gloucester, are at last fully satisfied of the sincerity of their promises, as a considerable number of landowners and others on that portion of the line have been served with notice to make terms for the sale of their lands.—*Wilts and Gloucestershire Standard*.

Chester and Crewe Railway.—We are requested on authority to contradict the statement in our last that the Holyhead line is abandoned. It is only waiting the removal of the present pressure on the money market. We are also informed that Stephenson's plan of crossing the Menai is not to take the carriages over singly, but at once, only separated from each other some eight or ten yards, which it is thought would avoid the undulation that may arise from having them altogether. We presume, then, by this plan the horse-power will be done away with.

On the 11th of July, the directors of this line inspected the works from Chester to Crewe, and passed about five miles along the permanent way in wagons. We understand that they were highly gratified at the progress and execution of the works, which do credit to the contractors, Mr. Brassey, and Messrs. Jackson and Bean, who have the construction of the line. In a cutting at Tiverton a plough is used by Messrs. Jackson and Bean, for breaking up the clay, by which the labour of a great number of men is saved, and the earth is more rapidly removed. In that cutting, a stratum of very pure gypsum has been found, a specimen of which lies at

our office. This mineral, in its powdered state, is very valuable as a manure for clover and grass; when burnt, it becomes plaister of Paris, and enters largely into the composition of Roman cement. From the progress of the works no doubt is entertained that the whole line will be open to the public next spring.—*Chester Courant.*

Dundee and Arbroath Railway.—By some mistake we did not receive the account of the meeting of this company, which took place on the 5th of June, until July. It was held at Dundee, John Sturrock, Esq., in the chair. After the report had been read, some discussion arose about the differences with Mr. Lindsay and Mr. Hunter, when P. H. Thomas, Esq., the banker, moved for a committee to endeavour to adjust the disputes, which was seconded by Mr. Willison, and carried; after which, and the usual votes of thanks, the meeting separated, very much pleased with their situation and prospects. The capital of this company is 100,000*l.* in 25*l.* shares. The length of the line is seventeen miles, beginning at the harbour and docks of Dundee, and terminating at Arbroath harbour, where it joins the Arbroath and Forfar Railway. The works were designed and executed under John Miller, Esq., of Messrs. Grainger and Miller, civil engineers, Edinburgh, and the whole affairs of the company and arrangements of the line are under the management of Adam Symon, Esq., Dundee.

Eastern Counties Railway.—We understand the dreadful state in which the ex-secretary left the accounts of this company will soon be reduced to more order. If so, and report be true, and the directors do their duty, a certain fellow may find that his career of vindictiveness is near its end. It is expected that the line from Brentwood to Brick-lane, within 400 yards of Shoreditch terminus, that is 18 miles long, will be completed about October. This will add 1½ mile to the viaduct. The present length now opened is 10½ miles. When the line is brought up so near to Shoreditch, and extended to Brentwood, we understand nearly every one of the long coach-proprietors have agreed to join the line. Of course the traffic will then be greatly increased.

Glasgow, Paisley, and Greenock Railway.—July 5th, the general meeting was held at Glasgow, Robert Dow Ker, Esq., in the chair. The report in another part of our Magazine, was, as the chairman observed, so full, that very little was needed by him to be said. It was three years ago, he stated, since this line was projected, two years were occupied in obtaining the Bill and preliminary matters, and within another he hoped to see the works completed. The consumption of coals in this place was 70,000 tons annually, of which 16,000 were exported, and the price was always excessive owing to their having to be carried from 25 to 44 miles. He hoped to see the price materially reduced, and the exports considerably increased, by the operations of the railway. About 3,500 men were employed on the line. To encourage the payment up of shares in full, it had been resolved to allow 5 per cent. on all balances, deducting the calls. 644 had, in consequence, been paid up, of which 569 were by local proprietors. The report having been received and adopted, it was resolved, as soon as 200,000*l.* shall have been paid, to permit the directors to take up on loan 133,333*l.* at any rate of interest not exceeding 5 per cent. Thanks having been unanimously and warmly voted to the directors, and, by acclamation, to the chairman, the meeting separated. We perceive, by an advertisement of a call on our wrapper, that this company have adopted the plan of allowing 5 per cent. discount on all the calls paid previous to the day, and of charging the same rate of interest on them if not paid on the day. This is not a bad plan, and we expect will have its effect. Our friends in the north understand business. From the account of a trip on this line in the "*Glasgow Adver-*

tiser," in which a vivid description is given of its beautiful scenery, it appears the works are proceeding very rapidly. In the Bishopton tunnel, 2,000 feet long, there appears, as far as we can comprehend it, to be a very novel kind of shaft, which is called an "eye," and is intended to light the tunnel. It is described to be over the middle of the tunnel, 300 feet long, 65 deep, and 45 wide.

"The mode in which the works are carried through Paisley is very imposing. The line may be said to traverse the very heart of the town, at a height above the level of the ordinary thoroughfares, of which the bridges in this neighbourhood can give no idea."

Glasgow and Ayr Railway.—It is expected that part of this line will be opened on the 1st of August, extending from Ayr to Irvine, being a distance of 11 miles. The Directors will give a public entertainment at Ayr in honour of the occasion.—*Kilmarnock Journal*.

Messrs. Stark and Fulton have completed two locomotive engines, which are to be shipped for Troon this day. They are in every respect beautiful specimens of workmanship, and finished in the highest style; they have been named the "Mercury" and the "Mazeppa."—*Glasgow Herald*, July 12.

A party of the directors of this railway, accompanied by some friends, and a few of the shareholders and gentlemen connected with the county of Ayr, went over the line between Ayr and Irvine, on Friday last, the 19th instant, preparatory to the public opening, which is fixed for the 1st of August. A train started from the dépôt at Ayr, at twelve o'clock, and proceeded to Irvine, eleven miles, which it reached within the half hour, notwithstanding a considerable stoppage at Barrasie Mill. The party returned to Ayr in twenty-four minutes, including a stoppage of three minutes at Barrasie Mill, to set down some parties, or at the rate of upwards of thirty miles an hour, thus proving the stability of the road so recently made. A dinner was provided at the Ayr Arms Inn, to which the party sat down at five o'clock. All expressed themselves highly gratified with the manner in which the experiment had succeeded, and the beautiful execution of the various works. We understand the fares have been fixed at 1s. for the third-class carriages, 1s. 6d. for the second-class, and 2s. for the first-class for the eleven miles, and that the distance will always be performed within the half hour, whilst at present the public are paying 2s. to go by an omnibus in two hours! Arrangements are also making to accommodate the Kilmarnock passengers who may avail themselves of the railway by going to Barrasie Mill, by the Duke of Portland's Railway, and the fares will be so regulated as if possible not to exceed the sums above stated, the distance being, however, fourteen miles from Ayr to Kilmarnock by this route. The remainder of the line is in course of completion, and four miles farther will be opened as far as Kilwinning, in September, and the whole way to Glasgow is expected to be finished by the 1st of May next year. We are authorized to contradict the paragraph, which has gone the round of all the newspapers, in an Ayr paper, concerning a certain "bottomless meadow" said to exist on the confines of Renfrewshire and Ayrshire, in the line of the railway. We are assured that no such obstacle exists, and that the only foundation for the story was a common boggy piece of ground, not of sufficient consequence to require the smallest preparations.—*Abridged from the Glasgow Courier*.

Great Leinster and Munster Railway.—A special meeting was held at the company's offices, Moorgate-street, to consider the plan to be followed in consequence of the abandonment of the Irish railways by the Government, Francis Wilson, Esq., in the chair. The report [in another page]

was read by P. J. Harte, Esq., the Secretary. It appears that the paid shares are about 17,000, and the unpaid 6,000, which it was proposed now to forfeit, and re-issue at a discount of 2½. Much discussion arose both for and against, but it was ultimately determined to postpone the forfeiture until August the 15th, by which time it was hoped, the Chancellor of the Exchequer's answer to the company's memorial of the Government lending one half the capital as soon as the other half should have been paid up by the proprietors, would be received. During the discussion several gentlemen expressed themselves very decidedly in favour of the goodness of the line; and nearly one and all seemed to feel acutely the great injury the Government's conduct had inflicted on the company.

German Railways.—That part of the Taunus Railway which lies between Frankfurt and Höchst was opened on the 7th of July. On the same day the Emperor Ferdinand's Railway from Vienna to Brunn, a distance of about 19 German (85 English) miles, was opened with great solemnity. The first train performed the distance in a little more than four hours.

Great Western Railway.—The directors have sent a donation of 100 guineas to the Royal Berkshire Hospital. The works on this line near the old Bridge, Bath, are proceeding with activity, and we hear that it is intended to commence operations in the fields near Bathampton immediately. Preparations for commencing the works near Wotton Bassett have been made.—*Bristol Journal*.

Since the opening to Twyford, five miles from Reading, on the 1st inst., a great increase of traffic has taken place upon this railway. The average number of passengers between Maidenhead and London has latterly been about 1,600 per day; but during the last fortnight, between Twyford and London, it has exceeded 2,400 per day. The receipts at the present time from this portion of the road only, are at the rate of 140,000*l.* per annum.—*Bristol Gazette*.

The mails will be transferred to this line as far as Twyford shortly.

Hull and Selby Railway.—This line is rapidly progressing in the neighbourhood of Hull. A great portion of the sea-wall has already been built; and from the excellence of the materials, and the science displayed in using them, it promises to be a work that will endure for ages. Large warehouses at the terminus are being erected: and judging from the present appearances this undertaking will be completed and ready for use at the time specified by the contractors.—*Hull Rockingham*.

Iron Trade.—It appears, from a very elaborate paper, read by Mr. J. Johnson, before the Liverpool Polytechnic Society, that there is at this time in Scotland 50 furnaces in blast, 5 out, 7 building, and 26 contemplated. In South Wales 122 furnaces in blast, 7 out, 31 building, and 91 contemplated. In 1740, the annual produce of the kingdom was 17,350 tons of cast iron. Mr. Johnson thinks it probable, from the above data, that in 1842, Scotland alone will produce upwards of 360,000 tons, and that within five years 1,000,000 tons will be produced annually in South Wales.

Irish Railways.—Just as we were about to congratulate ourselves and Ministers on the soundness of their policy, in abandoning the Irish job for railways, our attention was drawn to the attempt of an Honourable Member, Mr. French, in the House, on the 23d, to endeavour to revive it. We do not for one moment imagine but the Hon. Member believes what he says, but we must beg to assure him he is most lamentably ignorant of the subject and working of railways. As the House showed its sense of the object, and appreciation of the Hon. Member's long lecture about Roman roads, French roads, &c., by gradually withdrawing until only thirty-six Members were

left, listening or sleeping, we shall not trouble him now with any comments, but leave him nearly as the House did, in all his solitary glory, to speak, to hear, and to admire alone, the music and wisdom of his own periods, as well as Captain Moorom's letter and puff of a cotemporary. By the by, may we be permitted to ask what is that little object just visible to our optics in the distant ground of the gallant Captain's epistle? Is it place? Is it the honour of praise from one who insults public decency by proclaiming, that "a lie current and uncontradicted for a week is as good for all purposes of present effect as the best truth ever promulgated?" But of this anon.

We have, however, one word to say on the subject of Lord Morpeth's observation, "that if private enterprise should, by next session, be found insufficient to carry out the railroads, Government would re-introduce the subject." We beg to ask the Noble Lord, if such a declaration is not enough to damp private enterprise? and whether any one would not say his real object was to extinguish it, to have a pretext for remooting the question? If he be really sincere in wishing to serve Ireland honestly and disinterestedly, now is the time to prove it by acceding to the request in the Great Leinster and Munster report, in another page of our Magazine, that is, by aiding the company by loan when they have found half the capital. A more reasonable proposition cannot be made, and the course taken by his Lordship will decide the sincerity of Government in their patriotic professions. Let Lord Morpeth bear in mind that as "a cow gives milk by her mouth," so does a man gain content and happiness by his hands; and that bread earned, however brown it may be, is infinitely sweeter than bread given." Exactly as it is with a man so it is with a nation: if you wish them to be happy and good subjects, teach and assist them to be industrious.

Lord Morpeth will remember that the Great Leinster and Munster is the line which of all others his own commissioners approve. Let this then be his *experimentum crucis* of what private enterprise, judiciously assisted by a good Government can do. If it fail, we will acknowledge our error; if it succeed, we and the millions of England and Ireland shall feel grateful to his Lordship for the good he shall have done, and the noble course he shall have taken.

Leeds and Selby Railway.—A shareholder has complained to us, that he can get no satisfactory information of the state and affairs of this company, and has had no report from them for some two or three years. We presume there are respectable men at the head of affairs here. May we ask them, if this is a business-like way of proceeding? Be the situation of the company what it may, we presume it is but fair that the shareholders should know it.

Manchester and Leeds Railway.—It is with sincere pleasure we are able to announce, from the communication of a friend, the prosperity of this line. Only 15 miles of it, from Manchester to Littleborough, are opened, which is of course no criterion whatever of what may be expected from it when its whole length, about 48 miles, is completed. Our friend writes, "that the traffic, since the opening on the 4th, mentioned in another part of our Magazine, has exceeded that of any other line perhaps in the kingdom, amounting to an average of 2,083 passengers per day. In fact, the mass of business far exceeds the most sanguine expectations, and the demands of the public have left the arrangements for the partial opening far behind, and that with only clearing one road out of the three which the railway must sweep clean as soon as completed. When this is done, there is little doubt but the passengers will exceed 6,000 daily, while the traffic in goods will be greater than that of the Liverpool or any other

railway. For within three miles of the line reside 1,200,000 inhabitants, in a country rich in nothing but coals, and of course requiring everything to be carried to them, even to green-groceries, both for consumption and manufacturing." Would it be credited, that so blind at one time were the public to the merits of such an undertaking, that the company had great difficulty in proceeding with their works. But so it happened with the South-Western, which now takes more money for the line in a broken, unfinished state, than the whole Parliamentary estimates were; and so it happened with the Liverpool and Manchester itself.

Maryport and Carlisle Railway.—A full meeting of the directors was held on the 17th at Maryport, at which George Stephenson, Esq., the engineer, was present. A flattering report of the progress of the works was read, and not the least doubt now exists of the first seven miles of this railway being opened for traffic early in the ensuing October.—*Whitehaven Herald*.

Midland Counties Railway.—From the opening of this railway, on the 4th of June, to the 6th of July the average number of passengers has gradually increased from 360 to 900 daily. This week being the feast of Beeston, the number has been very great; on one day upwards of 3,600 were carried, and one train conveyed upwards of 600. The number calculated to travel upon this portion of the railway, before the Parliamentary Committee, was 240 per day.—*Manchester Guardian*.

Between Leicester and Rugby, great progress is making in the works on this line. It passes under the Lutterworth turnpike-road, a short distance from Dunton, and terminates by a junction with the London and Birmingham Railway. Near the latter place, it is carried over a viaduct of six or seven high arches, judiciously erected across the low meadows there, to avoid the inconvenience of floods during a wet season.—*Leicester Chronicle*.

Newcastle and Carlisle Railway.—The increase of traffic on this line is truly astonishing. The receipts for the week, ending June 29, were 1,934l., and for the week, ending July 6, 1,936l., being an increase of about 500l. on each of the corresponding weeks of last year.—*Tyne Mercury*.

North Midland Railway.—Notice has been given to the shareholders that they may now buy up their shares in full without any detriment to their selling them, which they could not do before.

The advanced state of this undertaking must be gratifying to the proprietors and contractors. The North Wingfield Kilnhurst (near Rotterdam) and Houghton (near Barnsley) contracts are near completion, while several others are not far behind. In reference to the tunnels, of that at Milford, near Belper, which exceeds 800 yards, scarcely 150 remain to be excavated. At Lodge Hill, near Alfreton, is a tunnel, of 250 yards in length, the whole arching of which is finished. Of Clay-cross tunnel, extending about a mile, the parts at different shafts remaining to be completed, do not collectively exceed 70 yards. About two-thirds of the Notton, near Wakefield, in the whole 500 yards, remain to be accomplished. The different bridges and viaducts are either erected or in course of erection. The viaduct near Rotherham, which carries the railway across the Dun valley, consisting of 36 arches, and extending about half a mile, is finished to the extent of about two-thirds, and the remainder is in a forward state. The principal part of the works is in the locality of Wakefield and Leeds. Near Wakefield is an embankment 60 feet in height, the highest on the line, and at this elevation the railway crosses the Barnsley Canal by a large viaduct of 5 arches, nearly the whole of which are nearly turned, and the embankment is now raised to the

level of the viaduct. The permanent rails are now being laid on most of the contracts, and about one quarter of the permanent way is already laid, the whole of which is expected to be completed in the course of a few weeks. This will also be the case with a portion of the line yet unfinished between Chesterfield and Clay-cross. Mr. Waring is actively employed in removing the earth at the entrance of the tunnel at Clay-cross, preparatory to laying the stone-work. The first portion of this line, expected to be completed, is that between Chesterfield and Barnaley.—*Doncaster Gazette*.

It is expected the part from Rotherham to Kilnhurst will be opened in about a month.

North Union Railway.—A dividend of 2½ or 3 per cent., it is said, will shortly be made to the shareholders in this line. During a period of three weeks in January last, 7,410 passengers travelled on this line, receipts 1,430*l*.; during three weeks in April, passengers 8,172, receipts 1,564*l*.; during a similar and more recent period, ending the 5th of July, the number of passengers amounted to 12,162, and the receipts to 2,301*l*.; being an increase, as compared with the first period, of 1,941*l*., and in the number of passengers, 4,752. The weight of merchandise traffic between Parkside, Wigan, and Preston, from the 1st to the 30th of June, both inclusive, was 2,238 tons; being upwards of 74½ tons daily.—*Preston Pilot*.

Paris and Havre Railway.—We have heard that Mr. Gibbs, the engineer to the Croydon Railway, has been consulted respecting this line.

Passengers' Tickets.—We have just seen a system of tickets, invented by the managing director, Richard Hall, Esq., of the Eastern Counties Railway, previous to the opening, June 18, in principle very much like those of Mr. Edmonson, of the Manchester and Leeds Railway. It is almost impossible frauds can happen by it. The colour of the ticket determines the place the passenger is going to from whatever station he may come, and, of course, is seen by the men at the station arrived at in a moment. Pink is for London, blue for Stratford, yellow for Ilford, and green for Romford. The class carriage he is to travel by is distinguished by strong lines at the top and bottom, both back and front of the ticket; so that, however twisted up, that is discoverable too, at a glance. One line at the top and bottom is for the first class, two for the second, and three for the third. The day of the month is also stamped on it. So far, for the prompt detection of fraud by the company's servants. For the security of the passengers, the price, place, from and to, the passenger is travelling; the class-carriage; and whether up or down, are printed in large characters. For the protection of the company, books of these tickets, containing so many hundred each, are given to the clerks at the several stations, with which they are debited. These tickets have stumps similar to bankers' checks, and on them as well as on the tickets are marked the number, the class, day of the month, and hour of departure, price, and places from and to which going. We believe also on the ticket is marked the clerk's name or initials. The highest number of the ticket of each class received by one man, compared with the issuing clerk's stamps, tells the number, and, multiplied by the price, the sum due by him. His own stamps and tickets remaining, are also another check. As far as we can understand from the obscure style of the describer of Mr. Edmonson's plan, the two systems are not much different, both gentlemen having hit on nearly the same method.

Railways with Scotland.—July 9th, a large meeting was held at Durham in favour of the coast line from Newcastle to Edinburgh. Mr. James Sawers, Mr. Skedd, and Mr. Cadell, as well as Captain Hay, Mr. A. J.

Hunter, General Carfae, Major Middlemas, &c., strongly advocated this line in preference to the middle line. Indeed it did not appear that any friends of the middle line attended the meeting. Resolutions were consequently put and carried unanimously in support of the coast line.—*Newcastle Journal*.

At a great meeting of the landed proprietors of Mid-Lothian and others, held at Edinburgh, on Tuesday, the 8th of July, Burn Callander, Esq., was called to the chair. The meeting were of opinion that one line of railway would be quite sufficient to connect Scotland with the south, and to communicate with the west and east parts of England. That a railway passing through the interior of the country will command a greater amount of traffic, &c., than along the sea-coast, and, therefore, thought Mr. Blackmore's line ought to be adopted, running from Edinburgh through the counties of Mid-Lothian, Selkirk, Roxburgh, and Northumberland, joining the Newcastle and Carlisle Railway at Hexham, and admitting of a line diverging to Glasgow. The meeting, in consideration of the support received from the different counties through which the line is to pass, appointed a provisional committee to take the necessary steps to promote the objects of the meeting, Mr. John Scott, W.S., was appointed secretary. Thanks were voted to Mr. Blackmore, the engineer, and to Burn Callander, Esq., the chairman.

In addition to the east and west lines already before the public, another has been projected by Mr. Cunningham, of Greenlaw, which, he says, would obviate the great difficulties, and embrace the principal advantages of the other two. He describes the outlines of his plan as follows:—"Beginning at Newcastle, to follow nearly the coast line to Belford, and by retaining a higher level, turn to the west of Lowlin, and keeping to the north of Dryburn and Duddo, cross the Tweed near to Milngraden, and proceeding nearly due west by Hirsellaw toll, Eccles, Newtown Ednam, south of Harrietfield, north of Makerstoun and Mertoun, cross the Tweed near Dryburgh, and proceed by Melrose; then cross the Tweed again, and up to the Gala-water line to Edinburgh. It will be seen that it intersects the best districts of country between the two extremities, it would connect the coal and lime fields of Northumberland and Mid-Lothian with a highly cultivated district, and would pass near the towns of Galashiels, Melrose, Coldstream, &c." He thinks portions of this line can be executed for less cost than similar portions of the other two lines, and is convinced that the line is shorter than either of the other two.—*Aberdeen Herald*.

Railway Communication with the Continent.—Since the completion of the railroad from Ostend to Liege, the number of passengers by Her Majesty's mail packets from Dover to Ostend, has been much increased. The great advantages anticipated by the completion of the South-Eastern London and Dover Railway, will doubtless greatly increase the traffic by this advantageous route.—*Dover Chronicle*.

Railroads.—One of the most stupendous works of modern times is a projected railroad from Venice to Milan, connecting the seven richest and most populous cities of Italy with each other—Venice, Padua, Vicenza, Verona, Mantua, Brescia, and Milan; the most gigantic portion will be the bridge over the Lagoons, connecting Venice with the main land. The length of the railroad will be 166 Italian (about the same in English) miles, passing through a population of 3,500,000, the seven cities having alone a population of 500,000—viz., Venice, 120,000, Padua, 44,000, Vicenza, 50,000, Verona, 46,000, Mantua, 34,000, Brescia, 42,000, and Milan, 180,000 inhabitants, to which may be added 20,000 foreigners in Venice and Milan. It is calculated the transport, when completed, will average 1,800 persons, 1,500 tons of goods, and 1,000 tons of coals daily.—*Foreign Quarterly Review*.

Railway Society.—[To the Editor of the "Railway Magazine," &c.]—Sir, —In your July number, p. 437, you say:—"We understand the great and respectable railway gentlemen of the north look coldly on this society, and keep aloof from it." I cannot answer for what is done in other places, but I can assure you that several of the most influential railway gentlemen of this town are members of it. I am, Sir, your obedient servant,

Liverpool, July 8th, 1839.

A MEMBER OF THE SOCIETY.

Russian Railroad from Kowno to Liebau.—This line is to be constructed immediately. The interest of the cost (at 4 per cent.) 16,000,000 roubles, (about 640,000*l.*) is guaranteed by the Emperor.

Stockton and Darlington Railway.—[To the Editor of the "Railway Magazine."]—The writer will be obliged by your reference to the "Railway Magazine" for June, 1839, where all the capital given for the Stockton and Darlington Railway is noticed as "100,000*l.* additional." The writer supposes the original capital is omitted altogether. Please to notice and correct this in your Magazine for August, and oblige
G.

July 22, 1839.

[Our correspondent will perceive, by the note at p. 294, that where the word "additional" occurs, the original Act passed before 1826 and the capital of it is not included. We shall feel obliged to our correspondent to furnish us with any particulars respecting this interesting line.—Ed.]

South-Eastern Railway.—This company have issued a circular to their shareholders declaring that, in compliance with their new Act, they shall henceforward pay interest not exceeding 4 per cent. on all calls paid and to be paid, provided the calls are punctually paid up; but if they are not, it will cease, and they will charge 5 per cent. on all arrears, making a difference on the arrears of 9 per cent. Three other contracts have lately been taken, and the works are proceeding as rapidly as possible at Tunbridge, Penshurst, and the tunnel and sea-wall at Dover. The tunnel is nearly completed.

The Thames Tunnel is expected to be opened for foot passengers in about fifteen months.—*Mining Journal.*

Talacre Coal Company.—The editor of the "Mining Journal" has made an attack on us respecting a letter in our last, by Mr. Suter, about the above company. Though our name stands at the head of the work, yet this calling on us by name is not a very courteous proceeding. However, it is a matter of perfect indifference to us. In reply to his half-put question—"How we came to take so extraordinary an interest in this company as to induce us to write to Mr. Suter?" we answer simply, that we had heard a great deal of the company, and having heard that Mr. Suter had visited the works, we, from mere curiosity, wished to have his opinion thereon. Having answered the "Mining Journal" editor's question, we now beg to ask him *how* is it, and *why* is it, he takes so extraordinary an interest against the company? At present we shall rest upon this one question, to which we desire an honest, true, and candid answer. As to the questions of figures of our cotemporary, the following letter will inform him that he is mistaken in the property altogether, and consequently his calculations go for 00000.

"To the Editor of the 'Railway Magazine,' &c., July 25, 1839.—Sir,—Observing in the 'Mining Journal' of the 6th instant an attack on the letter of Mr. Suter, relative to the Talacre Coal and Iron Company, inserted in your last Magazine, the only comment I have to make thereon is this:—Mr. Suter's observations were solely directed to the Talacre property, and not to that of Messrs. Foulkes and Co.; the latter property never was purchased by the Talacre Company, nor are they directly or indirectly con-

connected with it. This, therefore, affords an additional instance of the total want of truth which has pervaded all the slanderous and unfounded attacks which have been so wantonly yet so interestedly made upon this company through the medium of the 'Mining Journal.' I am, Sir, your obedient servant,

"A SHAREHOLDER."

York and North Midland Railway.—The general meeting was held in York, July the 8th, the Lord Mayor in the chair. After George Baker, Esq., the secretary, had read the report [in another part of our journal], the chairman said he was happy to inform the meeting that the traffic was increasing; and though he could not but regret the late decision of Lord Denman in Lord Howden's case adverse to the company, yet, fortified by the opinion of six judges on the other side, the directors felt it their duty to carry an appeal against Lord Denman's decision to the House of Lords. The report having been adopted and a vote of thanks *nem. con.* passed to the directors, the chairman said he was satisfied that this railway would prove to be one of the best investments among all the railways now in existence; he would allow of no exception. Their earnings amounted to the rate of 22,000*l.* per annum, on an outlay of 135,000*l.*, and that with an expenditure of less than any other railway; he had no doubt the entire expense would not exceed 100*l.* per week. The gradients of the line were such that it could be worked with little difficulty, and hitherto its success was beyond the most sanguine expectations. They had been enabled to run the mail train between York and Leeds within the hour; they had never exceeded the hour by above two or three minutes, and frequently they had done it in fifty-five minutes. When the Hull and Selby Railway was opened, a very large traffic would take place with Hull, to which place passengers would be conveyed from York by way of Selby, in an hour and a half. Then the south traffic would be enormous, especially when the North Midland and the North of England lines were opened in connexion with theirs; and the traffic from the west, including Manchester and the manufacturing districts, when the Leeds and Manchester line was opened, would also be very large. (Hear.) Each traffic would be capable of paying a very handsome dividend, and when united the revenue of this line must be immense. (Hear.)

Mr. ROWNTREE wished to know if arrangements were making for laying a second line of rails on the line from York to the Junction?

The LORD MAYOR said, Yes; the rails were all bought, and considerable progress was made in the necessary works.

In reply to a question, his Lordship said the number of passengers conveyed on the line last week was 3,218.

Mr. STAFFORD said that many of the Bristol men had lost on other lines, but had great hopes of getting their money back again at this. He would say a word about economy. At Manchester and Birmingham the stations which had been erected were like palaces; in this city the present station was as plain as possible. This was commendable.

The more immediate business of the day having been disposed of, a long and animated discussion took place, in consequence of a requisition, addressed to the directors, to stop the running of trains on Sundays. Samuel Tuke, Esq., took the lead in this matter, seconded by J. Meek, Esq. It is but justice to these gentlemen to say, that they exerted themselves powerfully and well, and, we believe, most sincerely and conscientiously, but the absurdity, the impolicy, and the injustice of the proposition to the public, were so ably set forth by Mr. Smith, jun., and other gentlemen, and were indeed so self-evident to the meeting, that it was lost by a majority of 350 against 283.—*Abridged from the York Chronicle.*

The mail train, on Monday week, performed the journey from York to

Leeds, a distance of 29 miles, in one hour. When it is considered that this train stopped twice on the road, and had to exchange the engines at the junction, which would be a loss of time of ten minutes, we may conclude that the speed throughout would be equal to 35 miles per hour. In order to avoid the disappointment of procuring coals, we understand a deputation of directors went to the pits at Garforth and Manston, on Monday last, and made an arrangement with the coal-owners to deliver 300 tons daily at the coal depot in this city. We may therefore conclude that the farmers and people residing at a distance may not be afraid of sending their wagons in future, as the supply will, on all occasions, be equal to the demand.—*York Chronicle*.

TRAFFIC.—Birmingham Railway.—The traffic on this line for the last four weeks ending :—

	Passengers.	Goods.	Total.
July 2,	£12,436 1 7	£1,280 19 4	£13,717 0 11
" 10,	12,135 7 7	1,363 11 2	13,498 18 9
" 16,	12,203 4 7	1,265 9 10	13,468 14 5
" 23,	12,508 5 9	1,320 3 4	13,876 9 1
		Cattle 48 0 0 }	

Croydon.—Traffic for each week, ending

June 28, passengers	10,230½, amount	£589 11 11
" 5, " "	12,978, " "	740 18 0
" 12, " "	15,399, " "	895 4 11½
" 19, " "	12,030, " "	697 0 2
" 26, " "	12,520, " "	726 13 3

Eastern Counties.—Total number of persons in five weeks ending 24th July, 42,150; total receipts, 1754*l.* 2*s.* 7*d.* From a calculation we have seen, it appears that the expenses of traffic, including police, clerks, &c. and locomotive power, are about 49 per cent. of the receipts.

Greenwich Railway.—Receipts for five weeks :—

1839.	Passengers.	Receipts.
June 23,	26,365	£925 18 11
" 30,	28,046	980 2 0
July 7,	34,461	1,208 2 10
" 14,	29,383	1,033 4 4
" 21,	32,399	1,135 18 9

Receipts from Croydon (not included in the above) are, from 5th June to 1st July, 511*l.* 14*s.*

Great Western Railway.—Traffic for the four weeks ending 30th June, 2,202*l.* 19*s.*; 7th July, 2,813*l.* 7*s.* 10*d.*; 14th do., 2,941*l.* 14*s.* 7*d.*; 21st do., 2,943*l.* 0*s.* 1*d.*

North Union.—For three weeks ending the 1st February, the receipts were 1,430*l.*, persons carried 7,410; for the same period ending 26th April, receipts 1,564*l.*, persons 8,172; and same period ending 5th July, receipts 2,301*l.*, persons 12,160. Thus upon the first period the increase of the last has been nearly 50 per cent.

South-Western (Southampton).—Traffic, week ending

June 30,	£3,018 3 2½
July 7,	3,263 10 7½
" 14,	3,437 2 1½
" 21,	3,440 5 6

York and North Midland Railway.—Passengers, merchandise, and receipts from the commencement to

July 1, 11,783 passengers,	£1,006 11 2
" 8, 3,218 " "	267 13 11
	£1,274 5 1

Merchandise :—

July 1, 4,038 tons,	£428 18 6
„ 6, 1,443 „	146 19 4
— 5,481	£575 17 10

LAW CASES.—*Brighton Railway without a Tunnel.*—[Pearson v. Mills, Common Pleas, July 9th] :—This was an action of the plaintiff, who had been solicitor to the above company, against the defendant who had been engineer to it, for slanderous expressions accusing him of having appropriated to his own use 1,200*l.* which he had received to pay the surveyors and engineers with. The defendant had also said, the New Coal Company was a swindling concern, got up by the plaintiff, who was solicitor to it, for the purpose of pocketing 50,000*l.*, the deposits. The language having been proved to have been uttered, a verdict was found for the plaintiff, 150*l.* damages.

Brighton Railway.—[Compensation Case]:—A jury of freeholders from the neighbourhood of Tunbridge Wells, was empanelled on Monday, at the Town Hall, Brighton, before Wm. Palmer, Esq., the under-sheriff, to decide on the value of a piece of land in the parish of Patcham, belonging to Mrs. Mary Elizabeth Roe, and consisting of about 14 acres, 24 perches, intended to be taken from a farm of 1,200 acres, by the railway company. The Attorney-general, Mr. Clarkson, and Mr. Merrifield, appeared on the part of the claimant, and Mr. Sergeant Wilde, Mr. Austin, and Mr. Creasy, on behalf of the company. The Attorney-General opened the business of the day, by addressing the jury in behalf of Mrs. Roe, stating that he thought the damage done, at a moderate value, might be estimated at 6,741*l.* 10*s.* The company had never made any objections to the demand upon any specified grounds, nor any counter offer, nor either did they call for any explanation; but delayed till the last hour, when their power of taking possession could be exercised, and they then made out the precept under which the jury had been assembled, which, on his part, he thought both harsh and arbitrary on the part of the company. Several witnesses were then called on the part of Mrs. Roe, who severally valued the land required, and damages by severance, at upwards of 6,000*l.* They valued the land taken by the company at 6*l.* per acre, on the average, and at 33 years' purchase.

Mr. Sergeant Wilde, at the conclusion of the examination of the witnesses, addressed the jury on behalf of the company, and concluded by calling upon them to judge for themselves, according to what they had seen of the land, and what they had heard of the facts, and not to surrender their judgments to the mere fanciful opinions of professional witnesses.

The inquiry, which lasted all the day, was then adjourned till Tuesday morning, when the under-sheriff briefly summed up, by explaining that the reason why a jury had been summoned from Tunbridge Wells was, because in the centre of the county through which this railway passed, there were supposed to be strong prejudices, both in favour and against this line, and in the western division, prejudices against it. As an impartial verdict was desirable, a jury free from local prejudice had been selected. The jury were at liberty to value the land as agricultural, garden, or building-ground, according as they believed it should be valued.

The jury, after consulting together about one hour, returned with the following award :—Value of the land (14 acres 24 perches), 1,758*l.*, and the damage by severance, &c., 2,282*l.*; total, 4,040*l.* The costs of the inquiry fall, of course, upon the company, and they will be "pretty considerable," as the briefs, with the fees to counsel on both sides, can be little, if anything, short of 1,000*l.*

The works intended on this part of the line are very heavy, as on this estate there is, in consequence of the natural undulation of the ground, an embankment 40 feet high, for a considerable distance, and then a cutting, which in one part is 62 feet deep.

This compensation case excited a great deal of interest on the line and neighbourhood, and was very strongly contested by both parties. The principal witness on the part of the claimant was Mr. R. Dickson, surveyor, of London. The company did not call any witnesses.

Glasgow and Ayrshire Railway.—[Compensation Cases, tried before Sheriff Dunlop and a special jury, at Paisley, on the 24th June]:—The quantity of land required by the company amounted to 20 acres, and lay immediately in front of Castle Semple, and the line passed within 130 yards of Lochside House. The two proprietors acted jointly; Mrs. Barr claimed 4,500*l.*, and Colonel Harvey 13,500*l.* for compensation. The company offered the former 2,000*l.*, and the latter 3,500*l.* The company afterwards agreed to deviate their line to the extent of 25 yards. Mrs. Barr and Colonel Harvey having agreed to this arrangement, jointly accepted 4,000*l.* in full of their claims of compensation for the 20 acres of land.—Abridged from the *Glasgow Courier*.

STEAM NAVIGATION INTELLIGENCE.

British Queen.—This vessel was spoken with at 6 A.M., on the 17th July, in west longitude, 22° 44', latitude 48° 24', north, by the *Pharsalia*, Captain Windsor, who reached Liverpool on the 22d instant. She had then all her sails drawing, and was proceeding along well and gallantly. The wind from the westward came on the following day and blew hard. When met she had been 4 days 18 hours from Portsmouth, and had gone about one-third of her voyage. This noble vessel, and her renowned competitor, the *Great Western*, will leave New York together on the 1st of August, which will afford a fine opportunity for emulous rivalry.

Great Western Steamer.—With more than a full complement of passengers this vessel has again departed from our port. At about half-past 3 P.M., of Saturday, July 6th, she got under weigh, and was very soon lost to the view of those who had assembled to witness her departure. Numerous applications for berths were compelled to be refused, and several gentlemen have been contented to avail themselves of sofa accommodations, rather than lose the opportunity of a passage in her. The number of passengers is about 120, and among these are several persons of distinction. Notwithstanding the immense space devoted for fuel, she has on board 700 packages of manufactured articles, and her cargo is altogether of a valuable description. The arrangements on board were conducted in a most efficient manner, and seemed to be a source of much gratification to the passengers and their friends. The vessel appeared to be in excellent sea trim, and the clean appearance of her decks and cabins excited the astonishment of all who beheld her. Mr. Brunel inspected her engines previous to sailing, and we are informed expressed himself in terms of the greatest admiration of their splendid order and the extraordinary cleanliness exhibited in the engine-rooms.—*Bristol Mirror*.

Great Western Company's Iron Steam-Ship.—We were much gratified on Wednesday last in witnessing, at Messrs. Bush and Beddow's (late Winwood's) iron-foundry, the open casting of a beautiful oblong plate, 17 ft. 6 ins. long, by 7 ft. 6 ins. wide, and 3 ins. thick, for the above Company, for the purpose of bending the iron plates to be used in building the new iron steam-ship. The plate, which is estimated to weigh between five and six tons, contains 2,236 cores or holes, and 48 counter sink cores. By

the kindness of the proprietors the wives and friends of the workmen were admitted to a view of the process of the casting, and the energy and precision manifested by those employed in the work reflected much credit on the establishment.—*Ibid.*

PARLIAMENTARY PROCEEDINGS.

HOUSE OF COMMONS.

BALLOCHNEY, June 28, Lords' amendments agreed to.—**DEPTFORD PIER JUNCTION**, June 27, read 3, and passed; July 8, Lords' amendments agreed to.—**Dublin and Drogheda**, June 27, pet. for leave to pres. a pet. for a Bill rep.: leave given; pet. pres.: ref. to Select Committee on pet.; pet. of Pierce Mahony, praying that the standing order requiring fifteen clear days between the day on which the pet. for any private Bill relating to Ireland shall be presented, and the day on which the Sub-Committee shall sit thereupon, may in this case be dispensed with; to lie on the table, and to be printed; June 28, leave given the Select Committee on pet. for private Bills to sit and proceed on Monday next, July 2; pet. for Bill rep.; rep. ref. to the Select Committee on the standing orders; July 5, standing orders committed; resolution rep., "that in the case of the Dublin and Drogheda pet. the standing orders ought not to be dispensed with;" rep. to lie on the table.—**MANCHESTER AND BIRMINGHAM**, June 28, Lords' amendments agreed to.—**MANCHESTER AND BIRMINGHAM EXTENSION**, (Stone and Rugby), July 1, leave to Committee to sit and proceed with two Select Committee members; July 4th, time further enlarged to rep. till Monday, July 15; July 8, pet. from Wrexham, in favour; to lie on the table; July 15, time further enlarged for Committee to rep. till Monday next; July 18, leave to Committee to sit till half-past four o'clock during the sitting of the House; July 22, time further enlarged for Committee to rep. till Wednesday, July 31; July 24, rep. that the Committee met according to adjournment, at twelve o'clock this day; that at the expiration of the hour a quorum of selected Members not being present, and the chairman (who was one of the selected Members) having sent a letter to the Committee, stating his inability to attend this day, the Committee proceeded to elect a temporary chairman for the purpose of adjourning the Committee till twelve o'clock to-morrow, and directed him to report to the House the circumstances of the case.—**MONKLAND AND KIRKINTILLOCH**, July 2, Lords' amendments agreed to.—**NORTHERN AND EASTERN (No. 2)**, July 8, Lords' amendments agreed to.—**RAILWAYS (IRELAND)**, July 1, pet. of the Bristol and Gloucestershire Railway Company, for the construction of a branch line of railway to Waterford, to lie on the table.—**RAILWAYS**, June 27, pet. of the Lancaster and Preston Junction Company complaining of the decision of a Committee of the House in refusing to hear the proprietors of an existing railway against a competing line; to lie on the table, July 16, pet. of common carriers for the adoption of measures for securing a fair and free competition on railways, &c., ref. to the Select Committee on railways; July 25, pet. of promoters of an intended railway from Newcastle-upon-Tyne to Edinburgh, praying the House to revise the standing order of last session requiring a deposit of 10*l.* per cent. to be paid before Bills for the construction of railways are brought in; to lie on the table, and to be printed.—**SLAMANNAN**, June 27, Lords' amendments agreed to.—**SOUTH EASTERN**, July 4, Lords' amendments agreed to.—**WEST DURHAM**, June 27, Lords' amendments agreed to.—**WISHAW AND COLTNESS**, June 27, Lords' amendments agreed to.

HOUSE OF LORDS.

[Omitted in our last.]

[NORTHERN AND EASTERN (No. 1), June 7, read 1st: June 11, read 2d, and committed for Friday next: June 13, pet. against of the Rev. Joseph Arkwright; read and ordered to lie on the table; Bill ref. to the Standing Orders Committee on Tuesday next: June 20, rep. from Standing Orders Committee, leave given to proceed with the Bill.—NORTHERN AND EASTERN (No. 2), June 7, read 1st: June 10, pet. of the Marquis of Salisbury complaining that the Standing Orders had not been complied with, and praying to be heard in support of the allegations; read, and ordered to lie on the table; Bill ref. to the Standing Order Committee on Friday next, and the above pet. also ref. to the Committee: June 20, rep. from the Standing Orders Committee, leave given to proceed: June 21, pet. of the Marquis of Salisbury against; read, and ordered to lie on the table; Bill read 2d, and committed.—PRESTON AND WYRE RAILWAY HARBOUR, AND DOCK, June 13, read 1st; June 17, read 2d, and committed for Thursday next: June 20, rep. without amendment: June 21, read 3d, and passed.—RAILWAYS (Ireland), May 30, pet. for further inquiry into the subject of, with a view of facilitating their construction; of proprietors, inhabitants, and other persons interested in the welfare of the province of Connaught (four pets.); read, and ordered to lie on the table.—SLAMANNAN RAILWAY BILL, May 28, read 1st; May 30, pet. of trustees of the turnpike-road leading from Glasgow to Redburn-bridge, by Cumbernauld, against; read, and ordered to lie on the table; and Bill ref. to the Standing Orders Committee on Tuesday next: June 6, rep. specially from Standing Orders and leave given to proceed; opposition withdrawn: June 7, read 2d, and committed for Tuesday next: June 21, rep. with amendments.—SOUTH-EASTERN, 31st May, rep. specially with the amendments: June 3, read 3d, with the amendments; Bill passed and sent to the Commons: June 6, returned from the Commons, with the amendments; agreed to: June 14, received the Royal Assent.—SOUTH-EASTERN (No. 2), June 20, read 1st: June 21, ref. to the Standing Orders Committee on Tuesday next, and a witness ordered to attend.—WISHAW AND COLTWESS, June 14, pet. against from owners and tenants of lands and minerals, and iron-masters and traders, and others interested in the trade of the railway; read, and ordered to lie on the table: June 17, Earl Bathurst, Earl Cadogan, Earl Chichester, Viscount Sydney, and Lord Gage appointed as Committee, to meet on Thursday at eleven: June 18, Lord Dunsany added to the Committee in the place of Viscount Sydney: June 21, rep. with amendments.]

WEST DURHAM, June 7, repd. specially from the Standing Orders Committee, and leave given to proceed: June 10, pet. against, from owners and occupiers of property on the line, read, ordered to lie on the table; Bill read 2d, and committed: June 11, pet. in favour, from landowners and inhabitants of St. Andrew Auckland Bracepath, read, and ordered to lie on the table: June 17, the Earls of Sandwich and Lovelace, the Lords of Sheffield, Dunmore, and Wenlock, appointed as Committee, to meet on Thursday, at eleven: June 21, rep. specially with amendments.]

BALLOCHNEY, June 25, repd. with amendments: July 28, returned from the Commons with the amendments agreed to: June 27, read 3 with amendments; Bill passed and sent to the Commons: July 1, received R.A.—BRISTOL AND GLOUCESTER, July 1, R.A.—CROYDON AND MERTHAM Co. DISSOLUTION, June 24, dissolution read 3, and passed: June 1, R.A.—DEPTFORD PIER JUNCTION, June 27, brought from the Commons,

read 1: July 1, read 2, and committed for Thursday next: July 4, repd. with amendment: July 5, read 3, with the amendment; passed and sent to Commons: July 8, returned with amendments agreed to: July 19, R.A.—MANCHESTER AND BIRMINGHAM, June 27, repd. specially with amendments: June 28, read 3, passed, and sent to Commons: July 2, returned with amendments agreed to: July 4, R.A.—MANCHESTER AND LEEDS, July 1, R.A.—MONKLAND AND KIRKINTILLOCK, June 25, rep. from Select Committee on opposed Bills; that the following Lords be selected and proposed to the House to form Committee on the Bill, viz., Earl of Scarborough, Earl of Hardwicke, Earl of Verulam, Lord Bayning, Lord Colborne; agreed to; Committee to meet on Thursday at eleven, and the pets. to be heard by counsel against; ref. to Committee, with leave to be heard, as also counsel for the Bill: June 27, repd. from Select Committee, with amendments: June 28, read 3, passed, and sent to Commons: July 2, returned with amendments agreed to: July 4, R.A.—NORTHERN AND EASTERN (No. 1), July 2, opposition withdrawn; Bill committed to all the Lords present; Committee to meet Thursday next: July 4, repd. without amendment: July 5, read 3 and passed: July 19, R.A.—NORTHERN AND EASTERN (2), July 2, opposition withdrawn; order for Committee discharged, and Bill committed to all Lords present; Committee to meet on Thursday next: July 4, repd. specially with amendments: July 5, read 3, an amendment made, passed, and sent to Commons: July 8, returned from Commons with amendments agreed to: July 19, R.A.—NORTH MIDLAND, July 1, R.A.—PRESTON AND WYRE HARBOUR AND DOCK, July 1, R.A.—SLAMANNAN, June 24, read 3, passed, and sent to Commons: June 27, returned from Commons with amendments agreed to: July 1, R.A.—SOUTH-EASTERN (No. 2), June 27, repd. from Standing Orders Committee, and leave given to proceed: June 28, read 2 and committed for Monday next: July 2, repd. specially with an amendment: July 3, read 3, passed, and sent to the Commons: July 4, returned from Commons with amendment agreed to: July 19, R.A.—WISHAW AND COLTNESS, June 24, read 3, with the amendments; an amendment made; Bill passed and sent to the Commons: June 27, returned from the Commons with the amendments agreed to.—July 1, R.A.—WEST DURHAM, June 24, read 3 with the amendments; an amendment made; Bill passed and sent to the Commons: July 2, returned from the Commons with amendments agreed to: July 4, R.A.

LONDON AND BLACKWALL COMMERCIAL, June 27, pet. from Wards of Aldgate and Portsoken, to be heard by counsel against; read and ordered to lie on table: June 27, repd. from Standing Orders Committee, and leave given to proceed: June 28, to be read 2d on Tuesday next: July 2, 2d reading appointed for this day put off to Thursday next: July 4, put off again to Tuesday next: and a pet. of the Lord Mayor, Aldermen, and Commons of London, praying to be heard against; read, and to lie on the table: July 9, pet. in favour of, from several others against, and praying to be heard by counsel; read, and to lie on table: July 9, order for the second reading, read; moved, that the Bill be now read 2d, objected to; an amendment moved to leave out "now," and insert "this day six months;" after debate, Bill read 2d, committed, and Committee to be proposed: July 12, pet. of James Tullock, praying to be heard against Bill; read, and ordered to lie on table: July 12, following Lords, for a Committee, proposed and appointed, viz., Earl of Morton, Viscount St. Vincent, Lord Calthorpe, Lord Minster, Lord Stuart de Rothesay; Committee to meet on Tuesday next at 11, and pets. in favour and against, ref. to Committee, with leave to be heard: July 16, several witnesses ordered to attend: July 18, pet. against of wine-merchants in immediate neighbourhood of proposed terminus; read,

and ref. to Committee: July 19, report from Committee, that the Committee had met and proceeded in consideration of Bill; but a material witness, whose evidence will complete the case for the promoters of the Bill, not being able to attend, the Committee adjourned at a quarter before three o'clock, to Monday next, at eleven o'clock; read, and ordered to lie on table.

INSTITUTION OF CIVIL ENGINEERS.

[Continued from page 367.]

Resin Fuel.—Mr. Williams laid before the Institution a series of specimens of turf, from the first state as taken from the bog, to the last when compressed, and after it was converted into a hard coke. He also described the new resin fuel, or artificial coal, and which was composed of resin and turf coke.

This resin fuel has been used in the Transatlantic steam-vessel; and, besides its heating powers and the saving of weight, it enables the firemen to maintain the required pressure of steam with great regularity.

The mode of using it was described to be to throw it in front of the furnace, after the charge of fresh coal. The result was, the keeping up the steam until the coals burned up, and a better combustion of the coal took place. As the result of several trials, it was found that $2\frac{1}{2}$ cwt. of this fuel was equal to 7 cwt. of Lancashire coal. It was not used alone, but associated with the coal. The vessels to New York took out from 40 to 60 tons each of it. Thus $2\frac{1}{2}$ cwt. of the resin fuel, and 20 cwt. of coal, was equivalent to 27 cwt. of coal. In practice, the steam-vessels now carry and use a large quantity of resin, but which could only be used in connexion with small coal or cinders. This new fuel was, therefore, more economical than resin. The price was 35s. to 40s. per ton.

Mr. Lowe remarked, that the statement of Mr. Williams respecting the peat fuel, led practically to inferences contrary to the results stated in Mr. Parkes's paper, and to Mr. Apsley Pellatt, and to his own experiments, viz., that 9 lbs. of coke would do as much in any department of the arts as 12 lbs. of coal.

Results so diametrically opposite, and from persons working on the large scale, and of known accuracy, were not to be disputed. It seemed that we had either yet to learn some unknown laws of combustion, or that the experimenter had not been alive to the differences resulting when combustion was conducted under the widely different circumstances which each experimenter might have in view. Mr. Parkes's test was the evaporation of a known weight of water by a known weight of fuel, coke or coal, employed. Mr. Pellatt's test was the circumstances most beneficial to the temperature of a glass-house furnace. Now these results, wonderful to relate, were strictly in accordance with the results of the experiments of Marcus Bull, of Philadelphia, whose test was the raising the temperature of a chest of known cubical contents (512 feet), by 10 degrees of Fahrenheit. All these experimenters find that, so far from coal and coke having the same value, it requires 4 lbs. of the former to produce the same effect as 3 lbs. of the latter. Now it does appear that the results of Mr. Williams are conflicting with these. He finds that equal work is produced in the marine engine by substituting 1 ton of a mixture of peat and resin for 4 tons of coal, which coal, in its composition, weight for weight, must contain a far less quantity of hydrogen and oxygen than is known to exist in the

generality of peats. It appears that 1 ton of peat and of a hydro-carbon, far more inflammable than coal, supersedes all the carbon, hydrogen, oxygen, and a little nitrogen, combined in four tons of coal. I would suggest as a theory for investigation, whether it may not be found that the coal or other fuel, which contains chemically combined the least oxygen, will not in its combustion give off the most available heat, owing to the oxygen combining with the hydrogen producing less water, which, as aqueous vapour, will carry up the chimney a large portion of the heat, but in a latent state.

Mr. Cooper remarked, that Marcus Bull's experiments were hardly applicable to the present inquiry, as he had constructed a box by which to ascertain how much air was heated by a given quantity of fuel, looking more to the domestic economy of the fuel than to its uses in the arts.

Dr. Faraday was of opinion, that a close comparison ought not to be instituted betwixt the application of heat to glass pots and to a boiler. In the former case an immense quantity of heated air passed away as in the smelting furnace for iron, where a greater weight of air passed through the furnace than all the other materials, as coal, limestone, and iron-stone; in the latter case there is an immense demand for latent heat. We know that a very small quantity of fuel is sufficient to heat and keep hot a large mass of matter where there is no rapid absorption of latent heat.

The experiments just referred to show little as to the absolute quantity of heat in different fuels, as there was so great a difference in the quantity worked out in the two cases. To imagine that the coke of a chaldron of coals should produce as much heat as the chaldron of coals, could not be the case, or the heat of the coke oven would go for nothing. But there is so great a difference in using coke and coal for heating glass pots and under a boiler, that the two cases cannot be compared. He should conceive that very great advantages might result from having a resin fuel in the front of the fire; the resin would, perhaps, not be advantageous by itself, but more advantageous with an inferior than with a superior coal.

Heat of Coke Ovens.—Several instances were mentioned in which it had been attempted to render the heat of coke ovens available for other purposes; the results were very contradictory. Many patents had been taken out for this purpose, but they failed. In one case, a coke oven heated the boiler of a steam-engine, but the steam generated was barely sufficient to move the engine when doing no work. It was found, also, in some experiments, that a proper coal for coking being used, there was no available heat for the generation of steam,—an improper coal being used, there was steam, but little coke.

Analysis of Coal.—Mr. Lowe remarked, that the analysis of coal was very imperfect. One author tells us that cannel coal contains no oxygen; but the gas-maker knows that this coal, though previously perfectly dried by being brought to a boiling heat, yields three times as much water, called ammoniacal liquor, as any other coal. This results from the combination of the elementary oxygen and hydrogen producing water, which as vapour is extremely greedy of heat. It was an important inquiry, whether the quantity of elementary oxygen in coal may not occasion the difference between it and coke.

Mr. Williams stated that peat employed in connexion with coal makes a most improved coke. If one-fourth of Lancashire peat be added to three-fourths of coal, a coke which the iron-masters pronounce to be the best for the manufacture of iron is produced, whereas coke from the coal simply cannot be used for this purpose.

Extracts from Smeaton's MS. Papers, communicated by John Farey, M. Inst. C. E.

Smelting Iron with Peat.—Mr. Smeaton, in a letter dated 25 Nov. 1778, remarks, that he had seen at Furness Fells in Lancashire a blast furnace for smelting iron with peat. This peat iron, made by Mr. Wilkinson, possessed extremely small grain, and the metallic atoms being very closely combined; and was found to answer well when mixed with other iron for making slit mill rollers.

Use of Peat.—Mr. Farey also communicated some extracts from the papers of Mr. Mushet respecting the manufacture of iron with peat; the quality of the fuel, and the nature of the iron produced therefrom.

Feb. 12, 1839.—The President in the Chair.

The following were ballotted for and elected:—Robert Hawthorn, Nicholas Harvey, William West, as members; J. R. McClean, as a graduate; E. W. Brayley as an associate; and General Sir John F. Burgoyne, R.E., as an honorary member.

Iron and Cement.—Mr. Simpson presented some pieces of iron hooping which had been imbedded for 26 years in cement, and which were blue as when first put in; the iron hooping had been placed round stone pipes at their junction, and covered with cement. From these specimens it is evident that a coating of cement is a perfect preventive of corrosion.

On the Properties and Composition of the Peat and Resin Fuel. By C. Wye Williams, A. Inst. C.E.

The nature of the fuel being of great importance in the manufacture of iron and arts generally, it is interesting to inquire into the value of peat for these purposes. Peat may also be used for railroad engines, and with peculiar advantage, being free from many of the impurities of gas coke: it may also be used in combination with resin, or other bituminous substances, as a fuel for long voyages. The bogs of Ireland were, nearly 30 years ago, designated by a Mr. Griffiths as mines above ground; who remarked, also, that the iron founders in Dublin might probably, ere long, be supplied with turf-charcoal, which is superior to every other for their purpose. The attention of the author was directed to the use of peat for the steamers on the Shannon, where coal is necessarily dear, and peat was at first used only for economy; the impediments to its use, from its bulk and dampness, being great. The property of holding and absorbing moisture is also a great impediment to its use, particularly in wet seasons, the only remedy for which is great care during the process of drying and in its subsequent preparation, any care being amply repaid by the diminished consumption. The evils of its bulk and low specific gravity may be obviated by compressing it when dry; when compressed perfectly dry, and kept free from moisture, it will preserve its bulk. From some observations of Tredgold, respecting the earthy impurities and odour of peat when burnt, it is obvious that he experimented on peats from the lower strata; but the author, in opposition to several eminent philosophers, maintains that turf coke may be made more effective than wood charcoal. The author, in his first experiments, came to the same conclusions for using the lower though impurer strata, simply because they were the denser, and rejecting the lighter kinds. The lower strata sometimes contains peat of a tolerable purity, but generally the upper and lighter portions are superior in the purity of the carbon, the intensity and quality of its heat, to those portions which have acquired density by time and natural pressure. When the density is acquired by artificial pressure, we have a substance superior to any other for all purposes of metallurgy.

PRICES OF RAILWAY SHARES.

Those finished are marked (1); in progress (2); which have their Bills, but are not begun (3); others (4).

NAMES OF RAILWAYS.	No. of Shares.	Share.	Paid.	Prices sold at.			Dividend per Cent.
				High-est.	Low-est.	Latest Price.	
(2) Birmingham and Derby . . .	6,300	100	£. 70	64	62½	64	
(2) Birmingham and Gloucester . .	9,500	100	50	32½	29	32½	
(2) Birm., Brist., & Thames Junc. .	7,500	20	18	...	...	9	
(2) Bristol and Exeter	15,000	100	25	10½	10	10	
(2)† Bolton and Preston	7,000	50	20	11½	11	11	
(2)† Cheltenham and Great Western	7,500	100	35	11	10	10	
(2)† Chester and Crewe	5,000	50	30	19½	19½	19½	
(2)* Do., Birkenhead	5,000	50	35	42½	40½	42	
(2) Commercial, Blackwall	24,000	25	11	10	8	9½	
(2)† Dublin and Drogheda	6,000	100	10	8	8	8	
(2)* Eastern Counties	64,000	25	16	10½	7½	7½	
(2)* Edinburgh and Glasgow (old)	18,000	50	10	10½	10½	10½	
Ditto, ditto (new)	5,000	...	5	...	...	4	
(2) Edinburgh, Leith, & Newhaven .	5,000	20	7	...	...	4	
(2)† Glasgow, Paisley, and Greenock .	16,000	25	18	10	9½	10	
(2)† Glasgow, Paisley, and Ayrshire .	12,500	50	20	16	15	16	
(1)* Grand Junction	10,400	100	100	204	202	203	12
(2) Gosport Junction	6,000	50	5	8½	7½	8	
(2) Great Leinster and Munster . . .	8,000	100	5	...	...	18s 6d	
(2) Great North of England	10,000	100	35	26	25	25	
(2)* Great Western	25,000	100	65	73	71	72	
* Do. New				3¼pm.	2¼pm.	3¼pm.	
(4) Harwich	11,000	20	1	...	...	½	
(2)† Hull and Selby	8,000	50	30	19½	15	19½	
(2) Llanelly Railway & Dock Co. . .	2,000	100	70	...	...	70	7½
(2)† Liverpool and Manchester . . .	7,968½	100	100	196	195	195	10
* Ditto ¼ shares	546	25	25	46½	46½	46½	
* Ditto ½ shares	7,968	50	50	76	75½	75½	
(1)* Leicester and Swannington . .	1,500	50	50	73½	70½	73½	8
(2) London and Brighton	36,000	50	22	12½	11½	11½	
(1) Do. and Birmingham	25,000	100	90	166	160	166	
Do. ¼ Shares	25,000	25	5	27½	27	27	
Do. New Shares			8	25½	24	25½	
(1) Do. and Greenwich	20,000	20	20	16½	15½	15½	3
Do. New Shares			20	19½	19½	19½	
(2) Do. and Southampton	20,000	50	50	45½	43½	45	
Do. do. New	16,000	25	25	...	...	...
(1) Do. and Croydon, Trunk	20,000	20	16½	12½	10	10½	
Do. New Scrip	6,666	20	10½	...	...	8½	
(1)† Leeds and Selby	2,100	100	100	70	70	70	
(2) Manchester and Birmingham . .	30,000	70	15	12	9½	10½	
(4) Do. and Do. Extension	15,000	70	7	5½	3½	3½	
(2) Do. and Leeds	13,000	100	50	69½	59½	69½	
† Do. New Shares	10,000	50	5	10	10	10	
(2)§ Maryport and Carlisle	4,000	50	32	7	7	7	
(2) Midland Counties	10,000	100	70	55	55	55	
(1)§ Newcastle and Carlisle	6,000	100	100	105	105	105	
§ Ditto ¼ shares		25	25	26	26	26	
(2) Northern and Eastern	12,000	100	18	7½	6½	6½	
(2) North Midland	15,000	100	75	71	60½	71	
(1)* North Union	3,200	100	100	67½	67½	67½	
Do. New Shares	3,200	50	50	...	...	64½	
(2) Preston and Wyre	2,600	50	44	...	...	42	
(4)† Sheffield and Manchester . . .	7,000	100	10	4	4	4	
(2)† South-Eastern and Dover . . .	28,000	50	12	4½	4	4½	
Do. New Shares			15	4½	3½	4	
(1) St. Helen's, Runcorn Gap			100	...	...	40½	
(1)§ Stockton and Darlington . . .	1,000	100	100	205	205	205	14
(2) Thames Haven	9,000	50	5	...	...	...
(2) York and North Midland	6,700	50	30	40½	30	37½	

* Those with a * are the Liverpool prices, which are to the 26th inclusive. † Scotch. Manchester. § Carlisle. The others are London prices to the 28th.

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